



is *Mihamahima Sri Brijendra Kishore Roy Chowdhuri*  
of Gourpore, Mymensingah.

is his name in the world and his one great motto  
"Lacore Omnia Vincit."

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# MOHUN'S COMING MAN

BY

PROFESSOR MOHUN C. R. DORASWAMI, B.A.

## MOHUN SELF-REALISATION - - LIBRARY - -

comprises of one hundred volumes, embracing, the making of Manhood and Womanhood through Health, Happiness and Strength; the function and object of Psycho-Physical Culture; the Ideal of Humanity through the Realization of the Great World Forces; Yoga, Pranayam, Asan, the Coiled-Serpent-Power in man. The sex problem, etc.

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1931.

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Professor MOHUN C. R. DORASWAMI NAIDU, B.A.

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Fig. 2

Repose in Action

Author's Pose on the 18th of August, 1930

SW 109



Fig. 3. Page 2. Rajbati, Gouripore, Mymensingh, where the author lived during the production of the

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## Errata.

1. Page 40, for Figure 18, No. 20, *read* Fig. 18, No. 20-21.
2. Page 70, for Figure No. 25, *read* No. 52.
3. Page 131, line No. 3 from the bottom, omit the words—  
“and assume No. 1.”
4. Page 173, omit Exs. No. 7(c), and 8(c).

*N.B.*—This volume was expected to cover about 120 pages and about 100 illustrations. But it has gone beyond our expectations to more than 250 pages and 225 illustrations, rather double our original scheme—There are many general points of health for our womenfolk and elderly gentlemen. What we have given in this volume are compulsory Exercises. There are many optional exercises for our young men and girls. There is also the subject of massage which is the art of manipulating the muscles and nerves of the body to increase the tone and energy of the system through better circulation of blood and rapid elimination of the toxins in it. These and many other points that could not be brought within the First Volume have been put in the Second Volume of the Coming Man. We have taken care not to repeat in the Second Volume what is contained in this, the First Volume.

We assure our young friends that if they regularly practise our system, they can decidedly improve their brain and body to their entire satisfaction. We earnestly wish our readers to register their names at once to get the Second Volume of the Coming Man.

*The Coming Man Office,*  
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Dist. Nadia (Bengal).



*C.R. Dnairu*

Fig 4

The Author in 1912



Fig 5

WE L.

Page 4

The Author in December 1928.

## PREFACE.

The Coming Man comes after all to usher in our midst, a new era of Health,\*Happiness and Liberty ! Life is not worth living if the body and mind of man are not harmonised and maintained in fit condition. Health is the harmonious working of the whole system to maintain a proper balance between the physical and mental aspects of life in the human body. To eat, to sleep, to live and move about and enjoy the various gifts of God, the one and the only one essential element is health. When health is taken away from man, *everything* is taken away from him. Even the richest and the mightiest person in power and glory, becomes helpless and miserable. Health is more than wealth. Health is Power. Health is Worshipful. Health is Divinity.

Young men, we send these words to you in the evening of our life's journey as our parting message, so that you may be forewarned and forearmed to live the Life Beautiful, Life Sublime and Life Divine ! Build your life in purity and truth. Take up Brahmacharya as a life of discipline and determination to practise the virtues of self-control, self-reverence and self-realization. Do not fritter away your energies but gather them into oneness of purpose and action. Discipline is a great factor and remember that Discipline leads to Development. Take a vow at once that you will never pass a day without going through some exercises given in this book for at least 20 minutes in the morning and if possible, about the same time in the evening, as a tonic of health, for this system has been arranged and systematised in such a way as to exercise and energise the various muscles, glands, and nerves and create in your body a spirit of union, co-operation and mutual sympathy to repel disease, and liberate the hidden powers in you for the fuller growth of your manhood and the better expression of your mental faculties.

The Coming Man presents a new system of Psycho-Physical Culture. Modern civilization through scientific development has been changing very rapidly the vision of life, so that the world is slowly drifting from the cult of brute-force towards the cult of brotherhood; from meaningless customs to reasonable standards of life; and from dogmatic creeds to ethical freedom. But the education of man seems to linger, nay, worship at the altar of diplomas and decorations, in converting man into a mere memory-land.

Mind and body must be correlated more and more in the open air nursery of independent thinking and breathing, rather than in the hot-house culture of tabulated curricula of studies, because the education of our children must not be a mere storage of facts and figures, but an evolutionary, nay, a creating process of expansion, expression and realization.

The Coming Man comes to fulfil this ideal.

"The University is turning out men of strong intelligence, but weak bodies. Some of them are moral and intellectual dyspeptics," said President Harper of the United States of America. There is a good deal of truth in this statement.

We had the good fortune to visit many Schools and Colleges in different parts of India and found out the fact that our young men think that the race of life depends more upon the brain than on the muscles. The result is half-built youths with weak waists and back-bones, poor limbs, pale, thin-faced and feminine looks and given to fashion and flippant talk. Many a young man with drooping shoulders, stooping back and a bad carriage, is a sight that we saw in almost every institution that we visited. "The weaker the body, the more it commands; the stronger it is, the more it obeys." "Strength of body and strength of mind; the reason of the sage and the vigour of an athlete, exhibit the most perfect model of a man and the highest refinement of the mind." Rousseau.



Fig. 10

Fig. 11  
Page 8



Two views of the Guest House of Mr. U. C. Chakladar where the author lived for some months with his family, while writing the *Coming Man*

Fig. 12  
Page 8



To  
ALL MEN.

Man, thou art not a machine ! Thou art the creator of machines, the revealer of hidden principles and the only intelligent Power who is in conscious partnership with Nature ! Realize that the soul of all culture, is the culture of the soul. Remember your thought is creative ! It is at first centrifugal and then centripetal. Do not hesitate ; do not fear ; but demand your birthright with intelligence, for Supply is equal to Demand. Man, thou art a living magnet, capable of drawing anything you require from the Power-House of nature, if only thou art aware of thy Oneness with Nature ! Thou art verily made in the image of thy Maker ! Thou art here for joy and glory ! Thou must dance with the rills, sing with the birds, smile with the fields and rejoice with the rising waves of the sea ! Thou must feel thy kinship with the resplendent sun and thy brotherhood with the silent stars ! Thou must ride on the clouds, bound with the leaping cataracts and blossom with the laughing flowers !

Man, thou art the redemption of creation ! Rise and sing, sing and dance, that a new era has dawned upon the universe, the era, not of brute force but Love ! not of Self-Determination but Self-Realization, leading to Health, Happiness and Liberty.

## THE COMING MAN.

Behold the Coming Man ! He is well-built, full grown, and majestic ; whose whole body is a beautiful expression of physical grace and symmetry, whose mind is broad and open, but whose will is resolute and unbending, whose flesh will bear witness to his spirit, as the long-lived, wisdom-crowned Rishis of old ; the man who is healthy and radiates health ; the man who lives long and whose body is free from seeds of disease, sin, and corruption ; the man who is optimistic and happy and cheerful under all conditions and circumstances ; the man who is free from doubt, fear, and hatred ; the man who will not take an insult lying down ; who on occasions of petty tyranny and repression, will rise full to the situation and cow down the wicked ; whose indignation is righteous and whose strong arms will force the oppressor down ; the man who will be above selfishness, greed, avarice, and meanness ; the man who will be a dynamo of power, infusing a new spirit wherever he goes and inspiring all with the high ideals of life ; the man whose will is for the service of the needy and who lives and moves for the good of humanity ; the man who *feels* the divine in him and the world abroad, who *sees* the divine in all and the universe, who out of unspeakable joy *becomes* one with the divine, as the saints and sages of yore in Aryavarta.

## INTRODUCTION.

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There is a constant war waged by man all his life. His existence itself is a battle between knowledge and ignorance, health and disease, power and poverty, and life and death. The world is in its throes at the present time to give birth to a new cult—the cult of Love—and a new principle—the principle of Universalism. Out of evil cometh good, and who knows that out of the last great war will not result the key-note struck by the late Poet-Laureate, Alfred Tennyson—"The Parliament of Man and Federation of the World?" The root principles of life ought to be kept pure, healthy, and strong without getting degenerated. If the mind is disciplined and conquered, there will be no need to fight the battles of bloodshed and horror. The soul becomes the victor when the mind is crowned with peace, when the body has exuberance of health, and men enjoy liberty.

The human body is the war-zone, the field of constant warfare. The main purpose of this book is to make man immune to disease, so that he may enjoy superb health and peace, poise of mind and supreme happiness; to make man not to wallow in sin, misery, and disease, but to make the Masterpiece of God, a hero, a lover, and an ideal being; to trample on chance and be the master of his situation and control fate by thought, perseverance, and labour, and become a power within himself, full of wisdom, strength and beauty.

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*Mens sana in corpore sano* is a sound ideal both for individuals as well as nations. If we only take a brief survey of the history of physical education from the pages of ancient Babylon, Chaldea, Egypt, and later on in Greece up to the downfall of the great Roman Empire, we see that mankind never lost sight of physical efficiency as the primary factor of life.

### GREECE.

Every schoolboy knows the great part played by Greece in ancient days. Even the gods were said to have taken part in the religious games and athletic contests of the Hellenes. Such renowned games as the Delphian, the Isthmian, the Nemean, and the Olympic games were held at particular places which gradually became centres of national life. The victors in these games were idolised and adored both by the people and poets, as heroes and patriots.

The life of a Greek youth was one continuous preparation for the defence of the fatherland.

The ideal of Spartan education was essentially of military character and developed hardihood, patience, courage, and perseverance. But at Athens, a wider and more comprehensive view of education was taken. Listen to Plato : " The mere athlete becomes too much of a savage and the mere musician is melted and softened beyond what is good for him " and that " he who mingles music with gymnastics in the fairest proportions, and best attempers them to the soul, may be rightly called the musician and harmonist : . . . Such are our principles of nurture and education." ,

Such should be ours also on the basis of the principles accepted by modern thinkers. Greek poetry, sculpture and art reveal that their ideal was beauty and symmetry of form, combined with a keen desire for music, literature, and politics. That they succeeded to a great extent in attaining to this ideal, is borne out by the heroism and chivalry displayed by their statesmen, poets, and soldiers in the history of their national development. It is a cruel fact that there is a limit to progress. The heroic Greeks took to luxury and dissipation and with the loss of their independence, there came a sad and miserable change in the national education and ideals of a people who have left in art, literature and ethics, models worthy to be copied by us.

## ROME.

We next see the rise of Rome, her conquest of the Macedonian Empire and assimilation of Greek culture and civilization. The Romans were materialistic and aimed at military pomp and acquisition of colonies. The real spirit of idealism and culture of æsthetics were wanting in the education of the Roman youth who was trained to live and die for the State. After the amazing rise of the Roman Empire into a world-power, the Romans fell into the snares of civilisation and neglected the severe training which the early Romans received both in the school and on the Campus Martius. They gave themselves to a life of ease, luxury, and libertinism and paved the way for the rapid decline and the terrible downfall of their great empire.

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## MEDIÆVAL EUROPE.

Mediæval history reveals the sad picture of deterioration in physique as well as in morals until the institution of chivalry brought back prestige to manhood and valour. On its general influence Mr. Cornish well says: "Chivalry taught the world the duty of noble service willingly rendered. It upheld courage and enterprise in obedience to rule, it consecrated military prowess to the service of the Church, glorified the virtues of liberality, good faith, unselfishness, and courtesy, and, above all, courtesy to women. Against these may be set the vices of pride, ostentation, love of bloodshed, contempt of inferiors, and loose manners. Chivalry was an imperfect discipline, but it was a discipline, and one fit for the times. It may have existed in the world too long: it did not come into existence too early: and with all its shortcomings it exercised a great and wholesome influence in raising the mediæval world from barbarism to civilisation."

## MODERN EUROPE.

In modern times, from the writings of Richelieu, Comenius, and Rousseau in Europe and Locke, Milton, Mulcaster, Herbert Spencer in England, we gather that sufficient attention was paid to physical culture. Germany under the leadership of Guts-muths and Frederick John, Sweden under Ling, France under Rousseau, and England under Mulcaster recognised the need to include physical education in the ordinary work of schools and colleges. For

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example we find in Germany in 1837—"Bodily exercises should be acknowledged formally as a necessary and integral part of male education and should be adopted as an agency in the education of the people."

### ENGLAND.

The system obtained in England is admirable. The bugbear of examination is not as harmful as in India. The school studies leave a great margin for athletics, sports, and games. The professors take part in them, as some of the European professors do in India. If the efficiency of a race is tested for endurance, will-power, and grit, the Anglo-Saxon race will carry off the palm in the contest. Britain under this system has produced full-blooded "animals" and strong-headed men. Shall not this be our ideal? We see new visions and new ideals before us. Let us make ourselves nobler, purer, and stronger to claim comradeship with the World Powers.

### SELF-CULTURE.

We want each individual to study the problem of self-culture and lead the nation towards a high ideal. "It is astonishing what power our mind has upon our body. Let the mind therefore always be the master," said Goethe. Bring the mind under discipline by reading good books, keeping good company, and holding good ideals. Be broad-minded and open to correction. Let there be a burning zeal in you for self-advancement and always aim at a high standard of morality. Do not yield to poverty, disease, and

evil thoughts. Never give room to doubt, or fear, for these are the unmistakable symptoms of mental deterioration, moral decrepitude, and spiritual disease.

Once the Plague met a man and told him that she had orders to kill 300. When they met again, the man asked her: "Why have you killed 1,000 instead of 300 as you told." "My friend," replied the Plague, "I am responsible for 300, but fear killed the rest."

Banish fear and acquire self-confidence, grow calm and self-reliant by surrender unto Him. True love and self-surrender are synonyms. Surrender and trust will make you calm and strong to bear all hardships with patience. Let the mind and body work hand in hand to produce harmony and rhythm. Your body is a temple. Purify it—strengthen it—beautify it. Let it glow with the warmth of pure blood and beautiful mind. Go to the mirror and see and admire the temple in which you are living. How beautiful it is! You can make it more beautiful, majestic, and powerful. It is not a store-house of disease, misery, and sin. It is the best and the only means through which you can realize the ideals of life. It is the ship in which sail your soul, mind, and emotions. Realize this. You are the pilot of your fate, the architect of your fortune, and the master of your destiny.

### WHAT TO DO.

The Indian race is a dying race to-day. Malaria and other diseases are creating a great havoc in our

midst. Our young men are goaded more to develop "memory-glands" and pass examinations than develop manhood and health. Of course, there is a great awakening everywhere towards physical culture. The system that we are offering is one that lays the foundation for general fitness. It prepares the ground for many to take to higher training. They may be in this sense called, Foundation Exercises.

Give one hour a day for self-culture—the culture of manhood and character. Give about 30 minutes for physical exercises, 10 minutes for massage, 10 minutes for bath, and 10 minutes for meditation. Bring yourself under a strict discipline, a severe regime, and a rigid programme; deny yourself to all things that entail wastage of energy and time; concentrate your mind on the ideal before you and with an unflinching determination, begin your work in right earnest to-day. Take a course of exercises arranged in such a way as to give work to all the various groups of muscles, the internal organs and vessels in the body. Practise deep breathing exercises regularly and along with it meditation and suggestion as shown in this book. Feel that you are transforming your cells, nerves, and muscles. Focus your mind on the part exercised. When you are working the biceps, biceps you become; the deltoid, deltoid you should become. Do not perform your exercises without a mirror.

### A METHOD FOR EVERYTHING.

Do everything methodically for success lies in systematic work. Our new system is a decided

improvement as it saves you from (1) unnecessary movements, (2) and muscular contractions, and thus (3) economises the expenditure of heat, and (4) the resistance of antagonistic muscles; you are therefore required to (5) spend as little energy as possible, and (6) the consequent need of any extra brain work to control and strengthen the muscles, nerves, and cells, and (7) the most important point in the method is the constant tendency to develop and nourish the brain-cells, rejuvenate them, and make the cerebellum a dynamo of optimism and hope. Aim at proportion, strength, health, and beauty !

### YOUR IDEAL.

Let your ideal take a firm and grasping hold of your will. Let your will etch upon the cortex of your brain, the outstanding features of your ideal. Let your brain go on chiselling your conduct, character, and physique. Do you wish to be a patriot ? A thinker ? A statesman ? Do you aspire to be a poet ? An orator ? A journalist ? What is your ideal ? Realize your own latent powers, your potentiality to do good, your possibilities in the right discharge of the duties of life. Let your ideal be high. Let it stand prominently before your mind's eye, a picture of your love and admiration, day and night. Let it move with you, eat with you, sleep with you, and even smile and chat with you. You need not then be anxious of success. Your ideal will steer you through all obstacles and difficulties to the haven to which your soul is bound.

## GENIUS.

You will see a Vidyasagar, a Vivekananda, a Ram Mohan, a Gokhale, a Rama Theertha, a Dayanand coming out of you. Genius in these great men was not anything that came from unknown quarters. It is the result of serious thought, persistent effort, incessant dreaming, hard toil, and a burning desire to rise higher and higher. There is that genius in you. There is that promise of a noble career in you. He that obeys is fit to command. Obey the simple laws of Nature and command the powers of understanding, speech, and action, the powers of imagination, deduction, and calculation, the powers of a strong personality and abiding faith and leadership. The century in which you come to play your part has opened its scenes with scientific triumphs. It represents the dawn of enlightenment. What better incentive do you require to goad you on to climb up the heights of culture. First be a Man and then the Master of your Destiny.

## THOUGHT DYNAMO.

Every man carries his thought-atmosphere with him. Just as we feel the nearness of a hot furnace by heat vibrations, so also we feel the presence of a personality by the thought-vibrations of that person—his strong personality sets the atmosphere in which he moves into vibrations in accordance with the thoughts he is able to project. The influence of men like Cæsar, Alexander, Charlemagne, Napoleon, Nelson, Washington and Wellington, are attributed to their superior personality. Go on

creating your atmosphere in consonance with the laws of God, feeling, realizing, and becoming one with the Universal Power. The outward acts reflect the inner-thoughts. Purify the inner self, strengthen it by powerful suggestions, incessant meditation, self-surrender and trust. Practise these things in all humility, in silence, and in solitude. Persist, persevere, and be patient. "Every right action and true thought sets the seal of its beauty in person and face." "Every volition and thought of man is inscribed on his brain, for volition and thoughts have their beginnings in the brain, whence they are conveyed to the bodily members, wherein they terminate. Whatever, therefore, is in the mind is in the brain, and form the brain in the body, according to the order of its parts. Thus a man writes his life in his physique, and thus the angels discover his autobiography in his structure."—*Swedenborg*.

"It was because **Morse** saw in his imagination a better way of communication than by post that he was enabled to give the telegraph to the world. It was because **Bell** could imagine something better even than the telegraph that we have the telephone. It was because **Field** could see in his imagination a better way of communicating across the ocean than by ship, that continents are tied together with cables. It was because **Marconi** saw even a better way of communicating than anything that had gone before that we have the wireless telegraph."

I want every one of you to enlist yourselves, into the order of Health and Happiness, the order to

which our ancient Rishis belonged, the order for which Budha Sakya Muni gave up his imperial throne for his begging-bowl to serve mankind ; the order for which Christ set an example before you by taking up the cross ; the order for which Lord Gaurang, our soul-enchanting Sreekrishna Chaitanya, appeared in "Golden Bengal " with the message of Love—Prem. He was Love-incarnate. His was the purest, noblest, and the grandest spirit that breathed in flesh and blood and lived the life of perfection and beatitude. Bear the standard of Love in the name of the Eternal Father and your motherland. Let every man take a pledge for God, Service, and Love. To the maxim Ahimsa Paramo Dharma, of Budha and Service of Lord Christ, I want to add that of Lord Gaurang—Prem Paramo Dharma—Love is the highest duty of man. Injure none—Render Service—Love all. These form the foundations of the Kingdom of God within you. Prepare the way to receive the Coming Man into this Kingdom.

Let us not lose the one which is lasting to that of the other, a mirage in life. Let us take up the work of establishing the Kingdom of God in the Universe. Let us enlist recruits to our army of salvation, not of India but of the whole world. Let the great war be the last war. India needs no sermons to sacrifice itself for the good of the world. Sacrifice, Yagna, is the birthright of India. I bring this message of Hope, message of Faith, and message of Brotherhood unto you, to join the order of Health and Happiness and usher in our midst the Coming Man.

## THE BEAUTIFUL HOUSE WE LIVE IN.

I would have his outward fashion and mien and the disposition of his limbs, formed, at the same time, with his mind. It is not a soul, not a body, that we are training up, but a man, and we ought not to divide him."

"Montaigne."

We are living in a beautiful house. It is not built of dead material like brick and mortar, but of living cells that are being constantly replaced by new cells, to preserve the continuity of life. It is not, therefore, wrong to say that we are living in a Living House and not a dead and lifeless one and the maker of this Wonderful House, is God.

Every part of our body so long as it is in active and living connection with the entire structure, is in a living condition, gets its nutrition through the whole body, goes through wear and tear, undergoes the usual repair and finally, is replaced by entirely new cells to carry on the routine work of life's wonderful machinery.

We repair our broken chairs and benches. But they are not living things. We repair our dwelling houses, with brick and mortar. They are dead material. But the cells that compose our body, are not dead matter, but living protoplasm. Each cell is a living cell. Our body is compared to a republic, but it is a republic of living cells, innumerable in number and inexhaustible in its scope of work.

Our life, therefore, moves in a sphere of living material. What is this life ?

Life is the most wonderful manifestation of the power of God Himself. His scheme of the universe includes many things, earth, water, fire, air and stars. But these are not living things, in the sense in which physiology interprets life. Men, animals, birds, insects and plants are living things.

Of these living objects there are certain organisms with only one cell and they are called one-celled living organisms. There are others, called multi-celled or many-celled, with hundreds of cells, in one organism. Let us understand superficially at least, what a cell is, as it is very essential for our future discussions.

What is a cell ? A cell is the unit of life. It is the physical basis of the manifestation of life. Wherever it is found and in whatever living organism, it has the following definite structure, namely,

- (i) Protoplasm or a Jelly-like, colourless, semi-liquid substance ;
  - (ii) a nucleus or a dense centre in the protoplasm ;
  - (iii) and a thin membranous, sac-like wall, enclosing the protoplasm and the nucleus.
- Fig. 13.

This is the simple structure of a cell and there is life in a cell. If there is no life, it is not a cell. Sand is made up of small particles, but not cells. Water is composed of particles or molecules of oxygen and hydrogen. These molecules are further divided into atoms. These molecules or atoms are not cells. A cell always conveys the idea of formation, growth

and division and further on, leading to decay and death. A cell does not come out of a dead particle, but from a cell of the same type. This is the chief peculiarity of a cell. You must thoroughly grasp the idea, rather the central idea, that a cell comes from a cell of the same type.

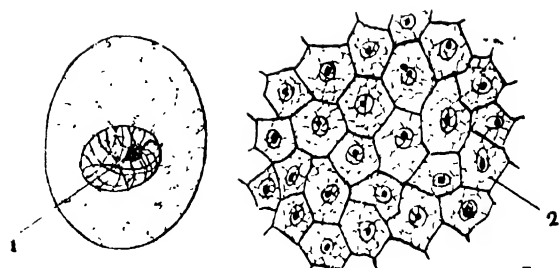
A mango seed will produce a mango tree. A cocoanut seed will produce a cocoanut tree.

Has any one seen that when paddy is sown in the field that cocoanuts come out of the harvest? No. Paddy produces rice and not cocoanuts. We are human beings and have human beings as our children. Tigers give birth to tiger-cubs and not cats and dogs. This is the law of nature which we recognise as the law of God.

So all living things are formed primarily, of cells of their own species or race. Every student ought to know something about these cells, as reference will be made to them often in the course of this book.

Further, it is essential to know, one wonderful truth about the cells, in one-celled organisms. It is their power to multiply and grow. Each cell divides itself into two parts. The division at first, begins with the nucleus N in figure A and proceeds further as in figure B, the stage where there is depression and elongation at N, as is seen in figure C; then we notice internal division in the fourth stage, in figure D; and in the fifth stage, we see division without detachment, figure E; and finally, the last stage, where the two cells are detached completely and are

Fig. 13 (1, 2)



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Fig. 14 (3, 7)

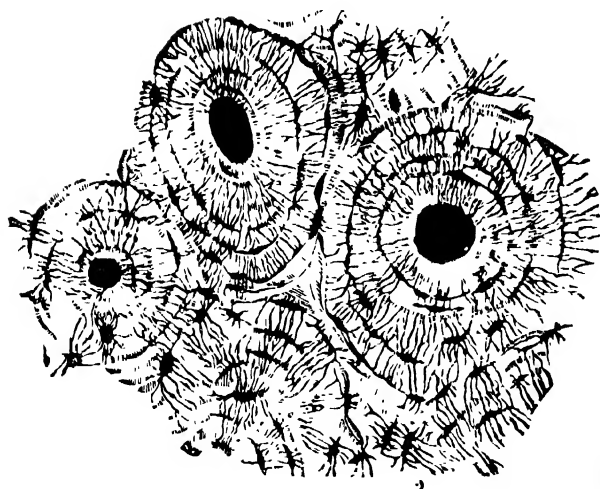
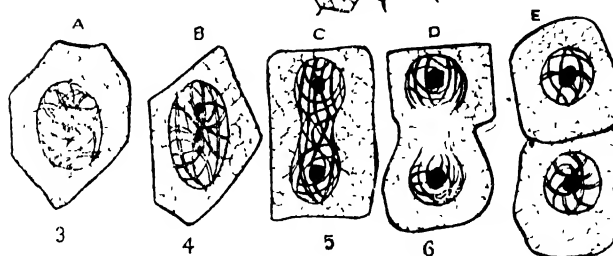
Fig. 16  
Page 39Cross section  
of bone.

Fig. 17

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1. Cartilage. 2. Periosteum. 3. Marrow. 4. Bone-Canal.  
5. Compact bone 6. Grooves in bone.

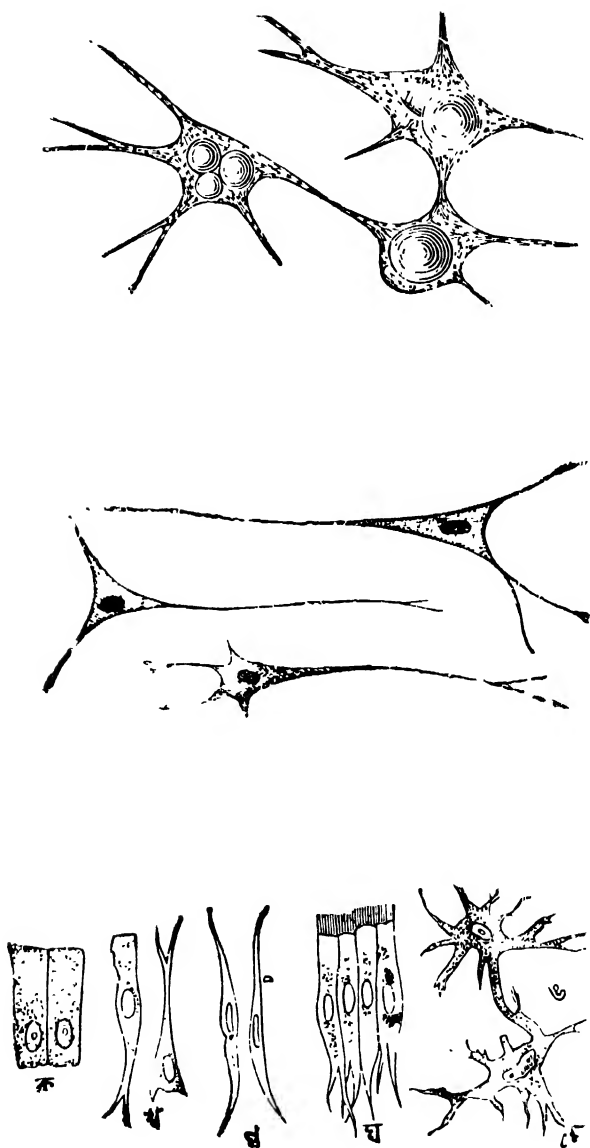


Fig. 15

Different Cells.

Pages 34—3

free from each other. This separation of cells, takes place only in one-celled organisms and each cell has its own freedom and movement. Fig. 14.

But in the multi-celled beings, the cells divide and multiply, but they never get separated and detached from one another, but exist in union with others, in one connected mass, as if they are glued together on the principle and understanding as it were, of liberty, fraternity and equality.

If you remember this, you will be able to follow our directions about energising the body ; about the transformation of each cell, into a powerful one ; about disease germs and how to have immunity from certain diseases such as cholera, tuberculosis, etc.

The temple of God is a living temple as it is built of millions of living cells. These cells do not fly away from the main body. They are attached and glued to it. Each cell, while it has its own life and death, depends upon other cells for its existence and repair and growth. Whenever these cells are dead, there are others to replace them. And so on, the continuity of life is kept up until the majority of cells, are able to carry on with the work of the body.

Man, you are a wonder by yourself. If you only know yourself, you will know many wonderful truths about this universe. There are many great principles that govern the constitution of your body and mind. The principle of Unity in Diversity, is seen in man to a degree that is not sufficiently apprised even by the most intellectual class of

humanity. Division of labour begins from the time of our birth, ingrained in us to be glaringly neglected and forgotten, in the outside application of life. The service of the individual for the good of the community, the sacrifice of the part for the safety of the whole and *vice versa*, the dependence of the wellbeing of the commonwealth upon that of the individual units of that commonwealth, the development through specialization of function, these and many other things, can be seen in the various activities of the cells in the human body.

The cells have their own growth and build themselves into special separate structures according to their functions. Function Creates Structure.

So far as the structure aspect of the human body is concerned, there are certain cells which form themselves into hard bones. These bone cells are reproduced from a Parent cell. These cells have their own function and existence and reproduce other cells like themselves and die without affecting the general life of the body. To ensure the general life of the body, the cells, that have become effete and decaying, are at once replaced by new cells that have been reproduced by Karyokinesis, or cell-division.

Bones are composed of bone cells. Muscles are formed of muscle cells. Nerves are built of nerve cells. Of these nerve cells, a certain group have developed the power to smell; another group to hear; a third one, to see things, their size, form

and colours ; a fourth group, to think and calculate. It is all the work of the cells. Fig. 15.

Man, therefore, means a collection or republic of cells, with different groups, doing different kinds of work, for the ultimate existence and wellbeing of the whole man. But, remember, that these cells cannot live as separate from the body. Once they are detached, they would die and to that extent, affect the existence of the whole system.

The division of labour is so beautifully arranged that each group of cells do their duty, not only for themselves, but for the general good of other parts of the body. For example, the stomach : It contains cells of digestion. These cells not only maintain their own existence, by replacing the dead ones by new tissues, but also digesting the food we take. Every organ or gland is composed of tissues of the same kind and every tissue is made up of cells of the same cast. For example, a tissue of the bone, a tissue of the lungs and a tissue of the kidneys, do not form into one organ. The tissue of the bone is composed of cells that are meant to serve as a firm and stiff ground for the muscles to be erected upon as superstructure upon a bony foundation. Whereas the cells of the lungs, are meant for a different purpose altogether, to contain soft and thin screen-like material, for the purification of blood by means of oxygen taken into the sieve of the lung-cells. Again, kidney tissues separate urea, uric acid and other poisonous material from the blood and pass them off as urine out of the system. For

these reasons the tissues of different structures cannot be grouped into one class. The stomach cells digest food for the eyes; the eye-cells find out food for the system. The legs walk to the food. The hands help it to the mouth. The teeth chew it and so on. Each function, is an act of service, showing the wonderful interdependence of one part upon another and establishing the great principle that through the right sort of co-operation alone, that the Body Republic can be preserved intact. We would draw the attention of our youngmen, to that beautiful old story of the Belly and the other members of the body.

The hands, eyes, legs, etc. of the body thought that they were all working hard and that the belly or stomach was an idle partner in the system. So they struck work and in course of a few days, they became themselves so weak that they came to their senses and continued their legitimate work and thus regained health and strength.

This beautiful and instructive story, reminds us of Saint Paul, in the Corinthians (XI-12).

The body is not one member, but many. The eye cannot say to the hand, I have no need of thee; nor again the head to the feet, I have no need of thee. There should be no schism in the body, but the members should have the same care, one for the other.

**Summary :—**

Our dwelling houses are built of dead material like brick and mortar. The human body is built of a living substance called cells. A cell is the unit of life. Each cell comes out of a living cell, through a process of karyokinesis or cell-division. God's power manifests itself as life in all living beings. In a one-celled animal the cells divide and multiply and each cell has its own freedom and movement in a detached condition. In a many-celled animal, the cells do not get detached, but live in a community, each cell doing its own work for the good of the whole animal; just as a part of the body lives for the whole, so an individual must live for the race.

**Questions :—**

What is the difference between the house built by man and that created by God? What is a cell? What is life? What are one-celled and many-celled animals? Describe cell-division and draw diagrams of your own. Name some different kinds of cells and their function. Give the substance of the story of the Belly and its members in Æsop's Fables. What is the moral derived from it?

## SECTION 2

### 4. ANATOMY, PHYSIOLOGY, PSYCHOLOGY.

Every one ought to possess a fair knowledge of the Human body ; how it is constructed and how it works.

Anatomy is the science that gives us all the information that we require, about the construction of the various parts of the body.

Human Anatomy deals with the structure of the human body. A superficial knowledge, at least, is necessary to appreciate the wonderful "House " in which we are living.

It can be divided into the following groups.

1. The Skeleton or Bony system.
2. The Muscular or Flesh system,
3. The Blood or Circulatory system.
4. The Respiratory or Air system.
5. The Digestive or Food system.
6. The Excretory or Wastage system.
7. The Nervous or Ruling system.

Physiology is the science which explains the work done by each organ and shows the interdependence of one organ upon another, in the different systems of our body and their respective functions.

Psychology is that science which deals with the subtle workings of the brain and mind.

**Summary :—**

Anatomy deals with the structure of the human body.

Physiology deals with the function of the various systems and organs of the human body.

Psychology deals with the various workings of the human mind.

**Questions :—**

What is Anatomy ? Physiology ? Psychology ?

### SECTION 3.

## THE BONY SYSTEM.

Bones are composed of bone-cells. They are one-third organic or animal matter, and two-thirds inorganic or mineral matter of phosphate and carbonate of lime. Fig. 16.

The bones serve the purpose of a frame work upon which the human body is supported and built. But for this hard frame work, the body would not have had its present shape. Several delicate organs and the brain are also protected by this bony frame. By means of a system of levers and fulcrums, pulleys, hinges and joints, the human body is able to execute various movements, such as walking, sitting, running, nodding, pulling, lifting and drawing, etc.

### JOINTS.

Joints are formed by the union of bony surfaces. A joint is also called an articulation.

### MOVEABLE JOINTS.

In the moveable joints, the surface is composed of a smooth layer of cartilage, and further, lined with a delicate membrane secreting synovia, an oily fluid, to permit an easy movement without causing friction. Fig. 18, Nos. 2, 5, 16.

### IMMOVEABLE JOINTS.

When bones are attached to each other firmly and permanently, we call the attachment, an immoveable joint. In the pelvic girdle and the skull we see immoveable joints. Fig. 19. But moveable joints are those where one bone moves in the socket or

groove of another, the bones being attached to each other by means of ligaments, such as knee joint and elbow joint. Fig. 18.

The whole of the human body would have been a deplorable structure if these moveable joints did not exist in it.

We could not swing our arms or legs, as in the ball and socket joints. Fig. 18, No. 2. We could not bend our elbows or knees in the hinge-joints, as in raising our hands or sitting. Fig. 18. No. 5.

We could not nod our heads or move our ankles and wrists, in the gliding joints, as at Football and Tennis. Fig. 18.

### KINDS OF BONES.

According to their structure, there are two kinds of bones :—1. Spongy. 2. Dense.

According to their shape, they are divided into,

- |   |               |
|---|---------------|
| 1. Long and cylindrical. Hands and legs.  | } Fig.<br>18. |
| 2. Short.....Wrist and ankles.            |               |
| 3. Flat.....skull, pelvic & sacral bones. |               |
| 4. Irregular bones.....Vertebrae.         |               |

Bones originate from cartilages. You notice in the nose and ears, a substance like rubber. It is called cartilage. It is a soft, gelatinous substance. It is found covering the ends of the bones at the joints. It is found in front of each rib, to make it elastic. It is also found serving as a cushion between each vertebrae, to prevent jars and jerks in the vertebral column. Fig. 18, No. 20.

Every piece of cartilage will not turn into a bone. It is only in some places it loses its transparent nature and becomes opaque and in course of time, changes in length and thickness, and gradually, a denser and compact tissue of bone, is formed.

### THE PERIOSTEUM.

There is a velvety coating of fibrous tissue on the bones and just under this covering, there is an inner layer which is very delicate and very important called the periosteum. If this layer is injured, the bone under it is also affected ; if it is destroyed, the bone also decays and dies, because the periosteum carries blood vessels to the bone. Fig. 17.

### THE MARROW.

This is a spongy substance found in the cavity of bones. It consists of nerves, connective tissue, fat and blood vessels. The yellow marrow contains more fat than the red marrow. Red blood corpuscles are formed in the red marrow. Fig. 17.

### LIGAMENTS.

Bones are held together at the joints by tough bands of connective tissue called ligaments. These ligaments also keep the tendons or tough white cords of connective tissue coming out at the ends of a muscle. These tendons connect the muscle or to be more explicit, they bind the muscle ends to the bone, by means of getting interwoven with the fine fibres of the periosteum. The ligaments keep these tendons

in their proper place, close to the bone to which they are attached. Fig. 23.

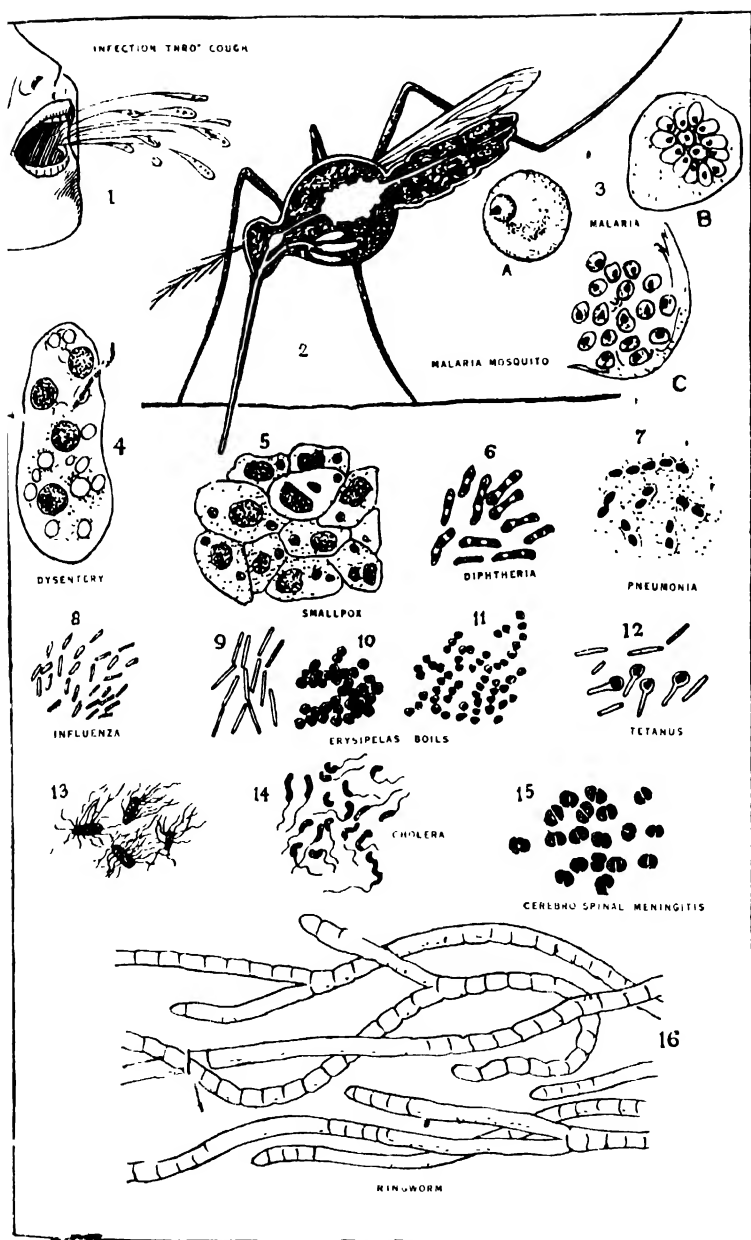
A knowledge of the joints, synovial membrane, the periosteum, ligaments and tendons, is necessary to know how you can manage yourself or others when there is a sprain or dislocation.

A fracture of a bone is quite different from the above two and very difficult to be handled by other persons than doctors, or specialists who should be consulted at once. Curvature of the spine, pigeon breast, malformation of the hips or ribs, all these can be set right, to a great degree, by proper exercise and massage.

There are 206 bones in the human skeleton of an adult. Some bones separate in childhood, in the lumbar and sacral regions, become merged into one in the advanced stages in manhood. So in the infant they count up to 217.

1. The Skull	..	28 bones
2. The Trunk	..	58 ..
3. The Hands	..	60 ..
4. The Legs	..	60 ..
		<hr/>
Total		206.

See Fig. 18.



Figs. 201 & 16. Disease Germs and the diseases they develop. Page 36

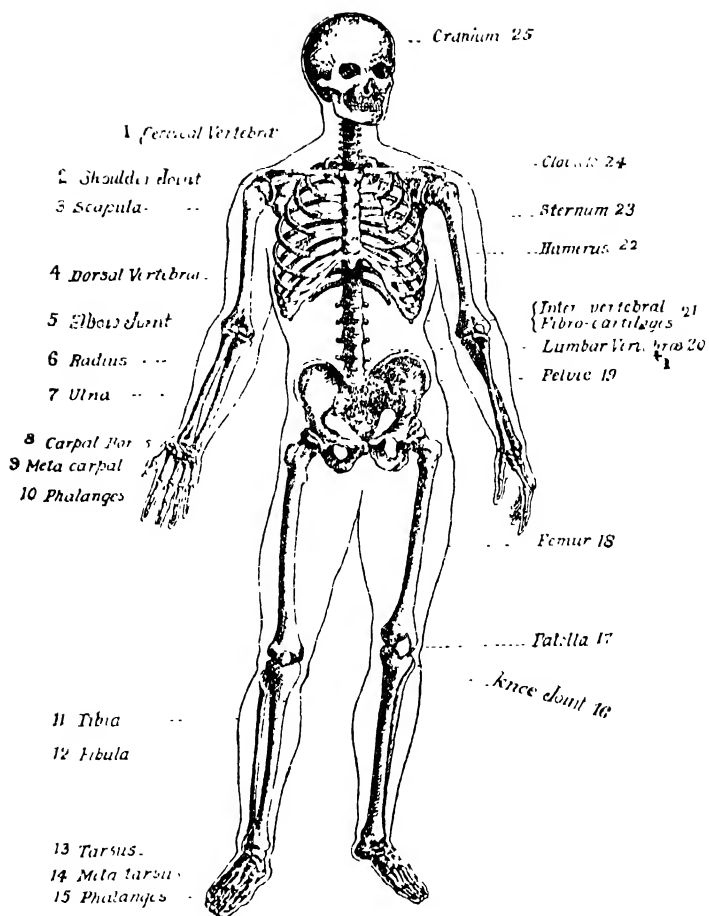


Fig. 18.

Pages 42 43

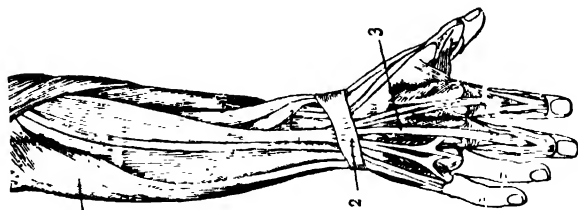


Fig. 23 1. Connective tissue. 2. Ligament. 3. Tendons. page 4

## HUMAN SKELETON. Fig. 18.

LEGS, 60 BONES.	FOOT—26 bones	<ul style="list-style-type: none"> <li>{ 7 Tarsus—(ankle).</li> <li>{ 5 Metatarsus—(instep).</li> <li>{ 14 Phalanges—(toes).</li> </ul>
	LEG	<ul style="list-style-type: none"> <li>{ 1 Tibia—(shin bone).</li> <li>{ 1 Fibula—(splint bone).</li> </ul>
	KNEE-CAP	1 Patella.
	THIGH	1 Femur—(upper leg),
HANDS, 60 BONES.	PALM—27 bones	<ul style="list-style-type: none"> <li>{ 8 Carpal—(wrist).</li> <li>{ 5 Metacarpal—(back of hand).</li> <li>{ 14 Phalanges—(fingers),</li> </ul>
	FORE-ARM	<ul style="list-style-type: none"> <li>{ Radius—</li> <li>{ Ulna—</li> </ul>
	ARM	Humerus—(upper arm).
	SHOULDER	<ul style="list-style-type: none"> <li>{ Clavicle—(collar bone).</li> <li>{ Scapula—(behind ribs, 2nd to 7th).</li> </ul>
TRUNK, 58 BONES.	PELVIS	<ul style="list-style-type: none"> <li>{ 2 innominate in adult. In infancy, 6 bones.</li> <li>{ Sacrum next below lumbar, 5 ossified in one.</li> <li>{ Coccyx—4, last bone.</li> </ul>
	VERTEBRAL COLUMN	<ul style="list-style-type: none"> <li>{ 24 vertebrae</li> <li> <ul style="list-style-type: none"> <li>{ 7 cervical—(neck).</li> <li>{ 12 dorsal—(back).</li> <li>{ 5 lumbar—(loin).</li> </ul> </li> </ul>
	THORAX	<ul style="list-style-type: none"> <li>{ Sternum—(breast plate).</li> <li>{ 24 ribs</li> <li> <ul style="list-style-type: none"> <li>{ 14 true—upper, 7 on each side.</li> <li>{ 10 false—lower, 5 on each side, 11th and 12th pairs—"floating" ribs.</li> </ul> </li> </ul>
	FACE—14 bones	<ul style="list-style-type: none"> <li>{ 2 superior maxillaries—(upper jaw).</li> <li>{ 2 nasal—(sides of nose).</li> <li>{ 2 lachrymal—(orbits of face).</li> <li>{ 2 turbinal—(bridge of nose).</li> <li>{ 2 palate—(roof of mouth).</li> <li>{ 2 malar—(cheek).</li> <li>{ 1 vomer—(in nose).</li> <li>{ 1 inferior maxillary—(lower jaw).</li> </ul>
HEAD, 28 BONES.	EAR—6 bones	
		<ul style="list-style-type: none"> <li>{ 1 Frontal—(forehead).</li> <li>{ 1 Occipital—(base of skull).</li> <li>{ 2 parietal—(sides behind frontal).</li> <li>{ 2 temporal—(contain ear canals).</li> <li>{ 1 Ethmoid—(in upper nose).</li> <li>{ 1 Sphenoid—(in front of occipital at base inside).</li> </ul>
	CRANIUM—8 bones	

**Summary :—**

The human body is made up of (1) Hard Bones. (2) Covered over with muscles, equipped with thin, thinner and thinnest pipes for, (3) Blood and (4) Air, with special apparatus for (5) Digesting food and assimilating it and for (6) Eliminating the wastage and refuse matter and last, though not least, to control, and rule and guide the whole system, (7) The brain-battery and nerve wires.

Bones originate from special cells.

There are 206 bones of different sizes and shapes.

There are moveable and immoveable joints.

The periosteum protects, the marrow nourishes and the ligaments bind the bones.

**Questions :—**

What are bones? Explain moveable and immoveable joints? Give examples of each. Name different kinds of joints. What is the function of (1) Bones, (2) Cartilage, (3) Periosteum, (4) Marrow, (5) Ligaments.

Name and draw diagrams of the bones in (1) The Cranium (2) Ear. (3) The Face. (4) Thorax. (5) Vertebral Column. (6) Pelvis. (7) The Hands. (8) The Legs.

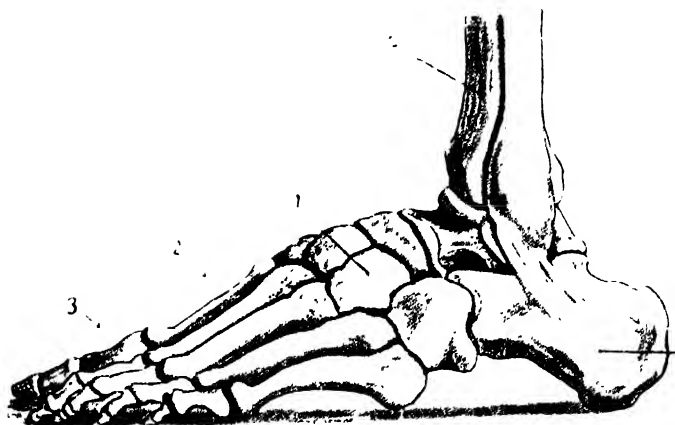
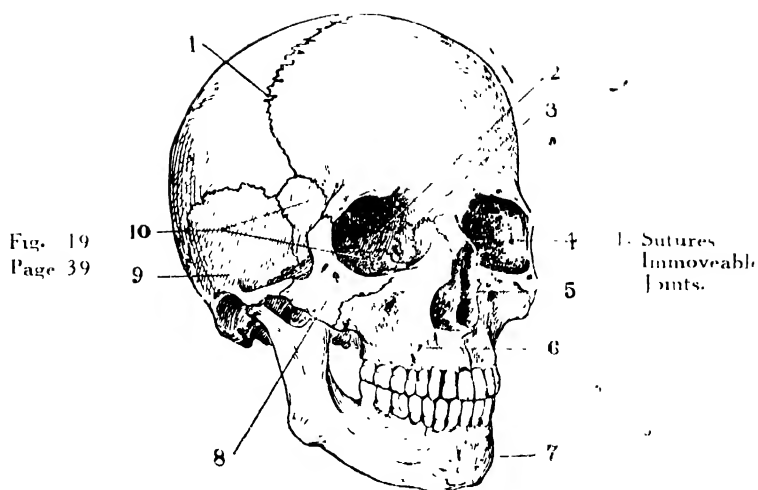
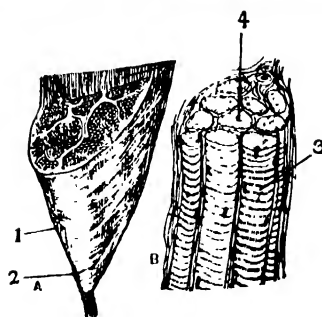


Fig. 20 1. 7 Tarsus. 2. 5 Meta-tarsus. 3. 14 Phalanges.

Figs. 21—22.

Connective Tissue.  
London.



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B4. Fibres.



## SECTION 4.

### THE MUSCULAR SYSTEM.

“In the healthy body every cell is polarised in subjection to the Central Will. Perfect health, therefore, is orderly obedience, government and harmony. Every cell is a living entity, whether of vegetable or animal potency, and wherever disease is, there are disunion, error, rebellion and insubordination ; and the deeper the seat of the confusion, the more dangerous the malady and the harder to quell it.”

J. C. Street.

It has already been stated that the human body is a republic of cells. But the cells in this chapter have a peculiar feature about them, namely, their power to contract. These contractile cells are arranged lengthwise, one after another, to the extent of about an inch and-a-half in length. These loose series form fibres, just as cotton fibres exist before we reel them into thread. Muscle means a mouse. Fig. 22.

These fibres are gathered into bundles in a sheath or covering of connective tissue and formed into a muscle. It is elastic, contractile and extensile. So a muscle is a bundle of fibres within a sheath of connective tissue, by which it is attached to the bones.

This connective tissue is a very important thing. It is found all over the body in various shapes and conditions. For example, it is this tissue which forms into a tough, white, twine-like cord, called a tendon (tendo-I stretch). A tendon binds the muscle to the bone. These tendons exist on

either side of the muscle, namely, its extremity of origin and that of insertion. Fig. 23.

When a muscle contracts, it is the tendon at the origin of the muscle, and the tendon at the place where the muscle is inserted into the bone—it is these tendons, that draw or pull the part of the body concerned and not the muscle. “Each muscle arising from one bone is inserted into another. In its course it passes over at least one joint, sometimes over more than one. A muscle when excited to contract shortens in length and swells in girth; thus it pulls upon the bones to which it is attached; if one of these be fixed, the other moves. The movement takes place in the joint over which the muscle passes.” Fig. 30.

You move the toes to and fro. The muscles moving them are not in the toes, but in the calf, far removed from the toes. Though far removed, they are connected with the toes by tendons. If they were not pulled by an arrangement of tendons, then, all the muscles that move the toes must have been located in the toes, or very near them, so that the foot, with these lumps of muscles, would look like a pumpkin, as in elephantiasis.

Tendons economise space, give a better shape and beauty and act more effectively.

We have seen that the bones in the human body serve as its “Steel-frame,” afford protection to various organs and serve as levers for making various movements, with the help of the muscular system.

So without muscles and tendons, ligaments and joints (Fig. 23), the various movements of our body

would have been impossible and what appears to be a graceful and beautiful figure, in form and colour, and what happens to be an object of intense pleasure, thrilling to the touch, would have been, but a hideous mechanism, or a log of rattling bones.

The one peculiarity about the arrangement of the muscles in our body, is that they are found in pairs, except a very few. There are 527 muscles in all, of which only five are single and the remaining 522 are found in pairs.

Head and Face	..	..	83
Neck	..	..	49
Thorax	..	..	78
Abdomen	..	..	33
Back	..	..	78
Hands	..	..	98
Legs	..	..	108

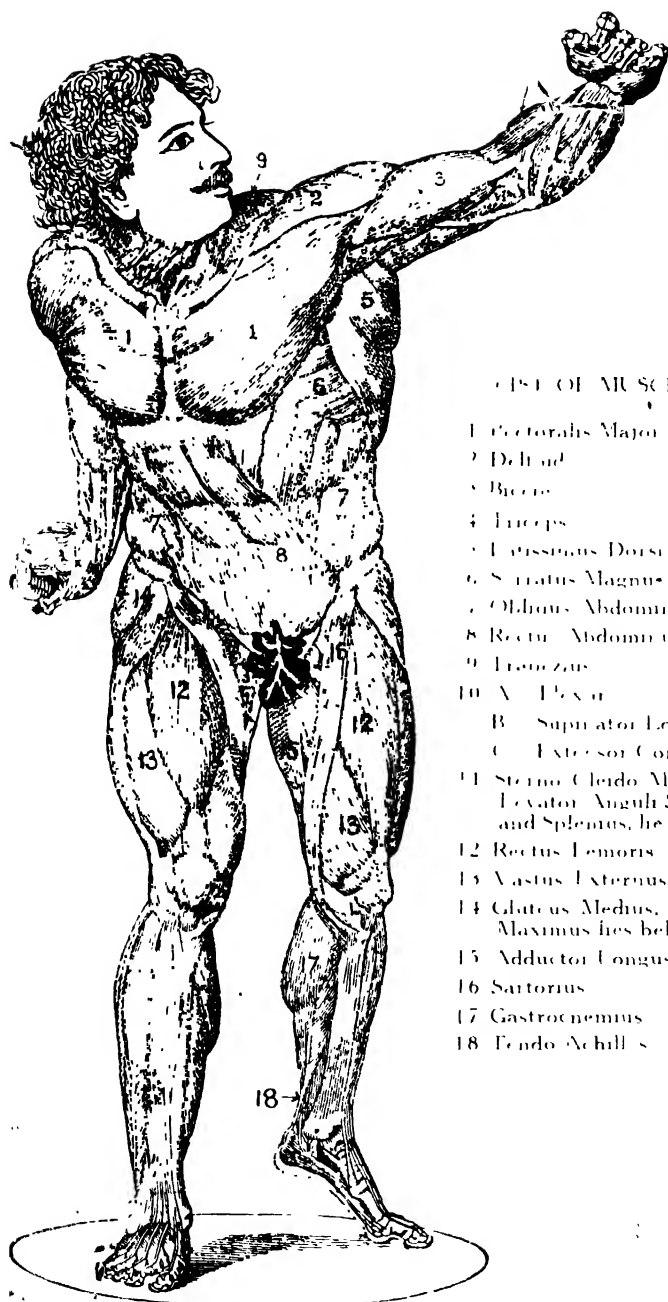
Figs. 25, 26, 27, 28 and 29.

When you are studying a book on physical culture, you must have some knowledge of the nature and function of muscles. You have already seen that certain cells whose nature is to contract and expand like rubber, form the muscle. So a muscle can contract or assume its usual size under certain conditions. It is not actually like a rubber. It is somewhat like it. A rubber expands when you pull it from both of its ends and assumes its original size, when this pulling is stopped. But a muscle is not so. It has got a certain size. But it does not increase and expand lengthwise like a rubber. What happens with the muscle is that it contracts and swells up into

a thicker and shorter size. So the term expansion of muscles is not literally correct. It is not expansion, but contraction which shortens the muscle and at the same time thickens it.

"The extensibility of muscle is of value in allowing a group of muscles to act without being strongly opposed by their antagonistic group. For instance, suppose the extensor muscles of the arm were not readily extensile, when the flexors acted, a large amount of their energy would have to be employed in elongating the extensors. Similarly the elasticity of the muscles tends to bring the parts back to their normal position when the muscles have ceased to contract."—Dr. D. Noel Paton.

Having grasped this clearly, then, you have to understand, further, another very important fact. Suppose you are standing with your hand hanging loosely by your side. This position of the hand which is the natural and easy one, is helped by a certain set of muscles. Suppose you bend the elbow and lift up your hand to scratch your head, then you make use of another set of muscles, by the contraction of which, the forearm is brought nearer the upper arm. So we see that in the first case, the muscle on the back of the upper arm, called the triceps, keeps the whole arm straight. The biceps which is in front of the upper arm, is also in its natural condition. But, this very biceps contracts, becomes shorter and thicker, when you lift up the forearm, in the face of the opposition of the triceps, which is all the while pulling it



## LIST OF MUSCLES

- 1 Pectoralis Major
- 2 Deltoid
- 3 Biceps
- 4 Triceps
- 5 Trissimus Dorsi
- 6 Serratus Magnus
- 7 Obliquus Abdominus
- 8 Rectus Abdominus
- 9 Transversus
- 10 A Flexor  
B Supinator Longus.  
C Extensor Communis
- 11 Sternal Cleido Mastoid.  
Elevator Anguli Scapuli.  
and Splenius, lie behind
- 12 Rectus Femoris
- 13 Vastus Externus
- 14 Gluteus Medius.  
Maximus lies behind
- 15 Adductor Longus
- 16 Sartorius
- 17 Gastrocnemius
- 18 Tendo Achillis

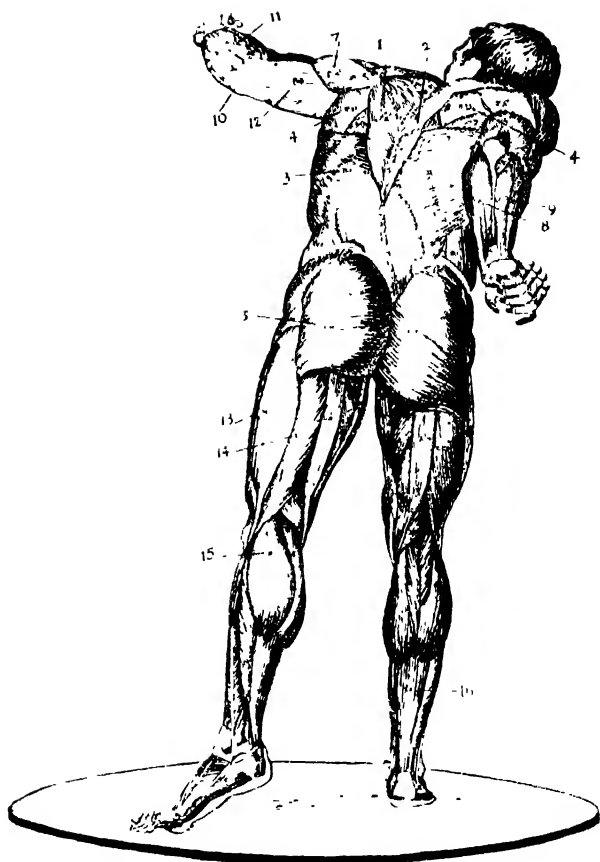


Fig. 26

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## CHIEF MUSCLES OF THE TRUNK, ARMS AND LEGS

1. Trapezius.
2. Rhomboideus
3. Latissimus Dorsi
4. Teres Major
5. Gluteus Maximus
6. Obliquus Abdominis Externus
7. Deltoids
8. Flexor Carpi Ulnaris
9. Extensor.
10. Anconeus
11. Extensor Carpi Radialis Longus  
Do. do Breviſ  
Do. Communis Digitorum
12. Triceps.
13. Vastus Externus
14. Biceps Femoris
15. Gastrocnemius
16. Soleus.

straight position. That is, the biceps and triceps of the arm, work in antagonism, and hence they are called antagonistic muscles. Fig. 30. So there are many antagonistic muscles all over the body which work in opposition to one another. Most of the muscles are arranged in pairs of opposing nature.

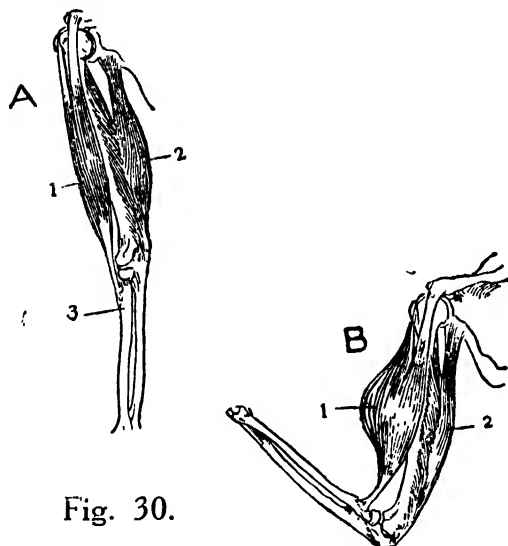


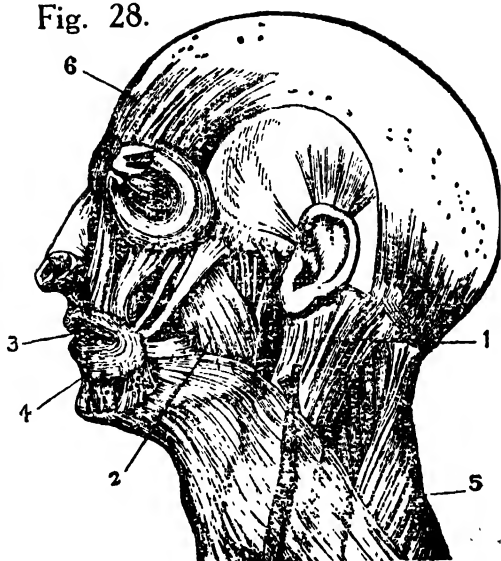
Fig. 30.

In a disease called palsy, the movements of the hand are very shaky and jerky. Why? Because some muscles are working and some others which belong to the opposition side, are in a

paralysed condition.

The opposition that we see in these muscles is not real opposition. It is meant only to safeguard the proper working of the human organism, to meet its growing needs and also any sudden demands made upon its resources on account of any novel situation in life. So, for a muscle that co-operates, the Synergetic muscle, there is a corresponding one, that non-co-operates, the Antagonistic muscle. Let us take the case of men sitting in a railway carriage. Very often we notice some of them go about nodding to and fro, in the act of sleeping.

Fig. 28.



Why? There are certain muscles that keep the head erect. They work only when the man is awake and alert. But when a man is getting sleepy, these act indifferently and hence the movement of nodding. But let us go a step further. Suppose he falls asleep, then he falls down, because the muscles concerned relax during sleep and the head and trunk cannot stand erect. Fig. 28, Nos. 1 and 5.

You hold the arm stretched at the level of the shoulder for five minutes. You experience great pain. Why? Although there is no movement made, yet, to keep the arm thus, certain muscles perform through the continued contraction, a hard work. Hence also an infant has to learn to crawl, at first, and then sit, and finally, learn to walk, as all these various movements require the action of various pairs of antagonistic muscles and their adjustment.

If you stand on one foot, it is more difficult to maintain your ground, than when you stand on two feet. This adjustment is called the equilibrium.

of the body. The centre of gravity must fall within the area of support. Then balance can be kept up. But if it falls outside the base, then the balance or equilibrium is disturbed.

### MOVEMENTS.

There is associated action of various muscles during movement. It is a matter of sympathy as well as necessity. In walking, it is not the muscles of the leg alone that are moved, but those of the trunk and hands as well. In lifting weights, in pulling, in climbing, in bending the body, in all these and other movements, we may safely say, that from head to feet, many muscles associate in the most ordinary movements of any part of the body. In this association, there is noticed a sort of opposition or antagonism. They apparently act in diametrically opposite directions, but really bring about harmony and adjustment.

“In the performance of a movement, no muscle ever acts without a corresponding contraction of its antagonist, which submits it as a kind of balance and control. The opposition is necessary to moderate, direct and make accurate the movements, . . . . two antagonistic muscles regulate each other ; when they oppose each other in a proper measure, the movements are precise and well co-ordinated.”

Co-ordination of movements in exercise consists in the proper selection of muscles which take part in a certain exercise ; their proper adjustment in the movements they make ; the regulation of the effort made by each muscle concerned ; the proper

posing of the various parts; the adaptation of muscles to distance or direction and the education of certain nerve-centres to select and guide the muscles that are brought into action and suppress and control those that are not required to act.

What we want physical culture students to understand is the great advantage of co-ordination of movements. It is through the principle of co-ordination that unnecessary wastage of energy and movements are avoided. It is through co-ordination that proper balance is maintained, and harmony created in the working of the system. It is through co-ordination that quickness and accuracy is secured in the various movements. It is through co-ordination that promptitude and efficiency is established in the various groups of muscles. These characteristics of balance, harmony, quickness, accuracy, promptitude, efficiency and economy of energy, have a wonderful effect upon the mental condition of the growing youth. This is the specialty of our system of physical exercises on account of their simplicity and co-ordination of movements. The various synergetic and antagonistic muscles are drilled and disciplined in such a way that they give quite a new life to the individual who practises our system. Theory will not help you so much as actual practice.

For an example of co-ordination, see combination of C and D and A, B, C, D, Exercises.

Students are more familiar with the biceps and triceps muscles. We take up these muscles to explain the co-operative antagonism in the movement of the



Fig. 31

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Sweet Innocence.

Our young pupil Rajkumar Prakritish Chandra Barua,  
during his childhood.



Fig. 32

Page 53

### Happy Smiles

Junior Rajkumar of Assam Gouripore Sreenan Prakritish Chandra Barua who is one of our hopeful students is performing our system with precision, beauty and cheerfulness.

Photo taken in 1929

upper arm. When you do the B exercise, sections 2,3, 4 or 5 in our system, you take the forearm to the shoulders. What happens in this movement? The biceps contracts to pull the forearm and the fist to the side of the deltoids and the triceps all along keeps pulling the forearm to its natural position which the hand ultimately assumes, when the contraction of the biceps is relaxed. Fig. 30. Nos. 1 and 2.

What is the advantage of this arrangement? It is meant for proper adjustment of a movement and to check it from being overdone or going crooked. It is also for the division of labour between various groups of muscles lying adjacent to one another.

**Muscles are classified as follows :—**

1. Voluntary.
2. Involuntary.

(i) Voluntary muscles are those which are under the control of the will of man. These do not move or work, unless through the intervention of the brain. These are found in the jaws, eyes, neck, abdominal walls, sides and back of the trunk, hands and legs. They are found generally attached to the bones of the skeleton.

(ii) Involuntary muscles are not under the control of the mind of man. These muscles go on doing the work allotted to them without the intervention of the human brain. Some higher power in the system guides these muscles. In physiology we associate their control with the sympathetic nervous system. These muscles are found in the heart, blood vessels, stomach, liver and intestines.

They are not attached to any bony levers.

But it is very interesting to note that there are certain muscles in certain organs which are sometimes under the control of the human will, but often act independently of any commands from the brain.

Such muscles are found in the diaphragm, sphinctres, lungs, etc. When we are asleep the lungs act involuntarily, but when we are awake, we can bring the respiratory movements under our will.

If there did not exist a scheme like this, then the action of the heart, lungs and digestion and assimilation, would come to a dead stop, as soon as man went to sleep. Certain organs are, therefore, taken away from the direct and active domain of the will and are put under a different nervous mechanism which is entrusted so long as life lasts, with a certain definite and perpetual routine and thus prevent any sudden calamity to the human system.

Whatever the man may be doing or not doing, certain muscles and certain organs go on doing their allotted tasks, so that, the system is automatically, kept up. For example the heart goes on pumping blood to the lungs on one side and to the rest of the body on the other side.

There is Purusha and Prakriti represented in our system. The automatic routine that goes on in our system, is the Prakriti portion of our body and life. Whether you want it or not, Prakriti goes on with her own instinctive work. It is the minimum of power with which God has sent us into this world or the minimum capital of energy with which He has started this Machine of Human Life.

What is the duty of man ? It is clear and evident. It is not his duty to be passive and inert. His greatness lies in the best co-operation he can give and gradually bring the cells of involuntary kingdom under the sovereignty of the human will, and make them voluntary as well.

It will be quite fitting to quote a paragraph from Dr. D. Noel Paton's Human Physiology.

### **“THE MASTER TISSUES OF THE BODY, MUSCLE, AND NERVE.**

By means of the epithelial and connective tissues the body is protected, supported, and nourished, it performs purely vegetative functions, but it is not brought into relationship with its environments. By the development of nerve and muscle the surroundings are able to act upon the body, and the body can react upon its surroundings.

These tissues may thus be called the **Master Tissues**, and it is as the servants of these tissues that all the others functionate.

So far as the chemical changes in the body are concerned, muscle is more important than nerve, for three reasons—First, it is far more bulky, making up something like forty-two per cent. of the total weight of the body in man; Second, it is constantly active, for even in sleep the muscles of respiration, circulation, and digestion do not rest; and Third, the changes going on in it are very extensive, since its great function is to set free energy from the food. So far as the metabolism of the body is concerned,

muscle is *the* master tissue. For muscle we take food and breath, and to get rid of the waste of muscle the organs of excretion act. Hence it is in connection with muscle that all the problems of nutrition—digestion, respiration, circulation, and excretion have to be studied.

### MUSCLE.

The two great functions of muscle are :—

To perform mechanical work.

To liberate heat.

The study of the physiology of muscle may be divided into :—

1. The physical and chemical characters of muscle at rest.
2. The modes of making muscle contract.
3. The changes which take place in muscle during contraction.
4. The source of the energy evolved by muscle.
5. Death of muscle."

We have to deal in this book with those problems which are intimately connected with the physiology of muscles, under the caption of Physiology of Bodily Exercises, such as the effect of exercise on muscles, the cause of fatigue and what lead to fainting and breathlessness. Physical culture students ought to remember one important fact that muscular contraction cannot take place without the production of heat. "When we warm a muscle, it changes its shape, and we see it shorten and swell. These effects

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disappear on cooling the muscle."(<sup>1</sup>) We popularly say that a man warms himself before he makes any effort for an exhibition of strength.

"Anger is, in principle, the prelude to an attack on an enemy, and animals or men, wishing to attack, make a series of gestures which are, in a sense, a preparation of their means of action. The dog draws back its lips to show the teeth which are going to bite, and man instinctively assumes a favourable position for the struggle."(<sup>2</sup>)

"He carries his head erect, with his chest well expanded, and the feet planted firmly on the ground. He holds his arms in various positions, with one or both elbows squared, with arms rigidly suspended by his sides. With Europeans the fists are commonly clenched."(<sup>3</sup>)

The movements referred to are made only to generate heat which is an indispensable factor for muscular contraction; but too much heat will destroy the muscle. Hence excessive muscular work will bring emaciation in the first stages and even death will be its ultimate result, if it is not checked after a certain limit has been reached. Have we not often heard that over-worked animals die, like race horses? We are tempted to repeat what we published in our Handbook in 1916, about the muscles of a washerman and some other artisans through overwork.

The washerman on account of his laborious work must necessarily possess well developed deltoids,

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1. Marey. *La Machine Animale*. 2. Lagrange. 3. Darwin.

biceps, etc. But we often notice him to be otherwise, because (1) his mind is on the hard work and not on his muscles ; (2) he has no interest or love for his work ; (3) he overworks himself, without any system, order, or limit to his daily task ; (4) he uses his muscles haphazardly, without knowing the basic principle of contracting certain muscles and relaxing others, and spends more energy in this way than economising it.

The same reasons hold good in case of stone-masons, punka-pullers, machine-rollers, etc. It must be admitted that some of them are strong and have the power of endurance and this for obvious reasons. The position of a physical culture student is quite different from these poor toilers of bread. What the physical culture student has to do is to take up his task cheerfully and systematically, before a mirror. He should feel the contraction of the muscle, not by straining it and stretching it, but by gently and methodically vibrating it. This method of contraction and relaxation of muscle through will-power combined with the exercises given in this book, will secure good results.

Take for example, the case of a good tennis or cricket player. How admirably his muscles spring to action at a certain turn the player takes. It is acquired by the constant training and discipline of the various muscles.

In our new system of Psycho-Physical Culture the body is not trained at the expense of the mind and the mind at that of the body. Both are correlated to

and co-ordinated with each other so as to bring about a harmonious development of both body and mind.

Reader, after you have begun to practise our system, you will feel that you are entering into quite a new world altogether—a World of Health and Sunshine, full of Hope and Faith, where the music of the inner self blends with harmony in Nature, when in sunshine and shower, in the distant clouds and in the bright flowers at your feet, in the silver cascade that shoots itself down the hills and the stream that sweeps across the laughing plains, in everything, you will see the image of thy Father, beautiful, lovely, and sublime !

What is this heat pointed out in a previous paragraph, due to? We say that it is combustion. The food that we take is chemically acted upon by the various elements of digestive juices that are secreted in the system, such as saliva, gastric juice, bile, pancreatic juice and the intestinal juice.

“ These chemical combinations are mostly, but not exclusively, oxidations, that is, combinations with oxygen. The oxygen is introduced into the system by respiration. It is fixed and retained there so as to form a provision which will be always ready for the chemical combinations, which are rendered necessary by the different functions of life. Although oxidations are not the only chemical actions of work, they are the chief ones, and oxygen is almost always made use of in the chemical combinations which produce heat.

“The oxidised compounds formed during combustion, can be placed in two categories ; the products of complete and of incomplete oxidation. Carbonic acid and water are the final stages of all the complete oxidations of hydrocarbon substances, and urea is the last stage of complete oxidation of nitrogenous substances.

“Besides these substances there are other products formed at the expense of the same tissues with which a smaller quantity of oxygen is combined, and which are consequently the result of a less advanced oxidation or of an incomplete combustion.

“In a furnace, the oxygen of the air, which combines with wood in order to burn them, gives rise to products of incomplete combustion which are smoke and soot. These products have not been carried to the furthest stage of oxidation or combustion, for we can submit them afresh to the action of the oxygen of the air in smoke-consuming apparatus in order to burn them more completely.

“Similarly uric acid, for example, is a product of incomplete combustion, and can undergo a further degree of oxidation. If we inject a quantity of this substance into the blood of a living animal it is further oxidised and transformed into urea.

“Uric acid is only one of the numerous organic products which result from incomplete oxidation, and which we call waste-products of combustion.

The products of dissimilation, . . . are dangerous to the system, and their presence in the blood becomes incompatible with health when there is any excess of

them. There is no danger when there is only a moderate quantity, for then the system can quickly relieve itself of them by means of the organs specially charged with their elimination.

"The lungs, the kidneys, the skin, and the intestine have among their functions that of eliminating from the blood whatever harmful or useless substances are present in it, whether they have been formed there or introduced into the blood from without.

"These four organs are specially charged with the removal from the system of products which are formed everywhere as a result of combustions. The lungs remove carbonic acid, the kidneys urea, the skin lactic acid, etc. All these are the waste products of vital combustions. To these three well-known substances it is necessary to add a great many more, of which we know very little. Fresh researches are daily throwing new light on the functions of excretion, and show the capital importance of the part they play in the system."

F. Lagrange.

**Dr. D. Noel Paton.**

"Muscle then is a machine which has the power of liberating energy from proteids, fats and carbohydrates, but it uses proteids chiefly in construction and repair."

"The death of the muscle is not simultaneous with the death of the individual. For sometime after somatic death, the muscles remain alive and are capable of contraction under stimulation. Gradually, however, their irritability diminishes, and finally disappears. They are then dead." Rigor Mortis sets in.

## THE THREE KINDS OF LEVERS.

After getting a rudimentary knowledge of bones and muscles, we ought to be able to understand something of mechanics regarding the system of levers in our body.

“In the higher animals the essential principle of locomotion is that the moving part first forms a bend or angle, and then is straightened out against some resisting substance. The principle is the same whether the locomotive members be fins, wings, or legs, and whether they move in water, in air, or on the ground; for air, water, and ground afford resistance to bodies which strive to displace them. The force exerted against a resisting substance reacts in proportion to the resistance, and imparts movement to the body of the animal.

A man swims by slowly bending and rapidly straightening his limbs. He throws the water from him, and the water, resisting the repulsion, throws the man forwards with equal force.

In order to jump, a man bends his legs, and then, by suddenly straightening them, pushes the earth. Mother earth is thrown in one direction, the man's body in another, and with equal force; but the force which will carry the weight of a man over a five-foot gate does not appreciably move the world.”

A lever is generally a bar of metal turning on a support or prop, called the fulcrum, for imparting pressure or motion from a source of power to a resistance—of three kinds, according to the relative position of power, weight and fulcrum.

- 1 Fulcrum is between Power and Weight P F W.
- 2 Weight is between Fulcrum and Power F W P.
- 3 Power is between Weight and Fulcrum W P F.

### Examples :—

First order:—

1. (a) Ankle joint. If you contract the (calf) gastrocnemius muscle and tap the toes on the ground or
- (b) Push upon some object with the toes.
- (c) The nodding of the skull on the atlas.
- (d) The movement of the trunk on the pelvis.
- (e) Straightening the elbow joint.
- (f) Scissors.

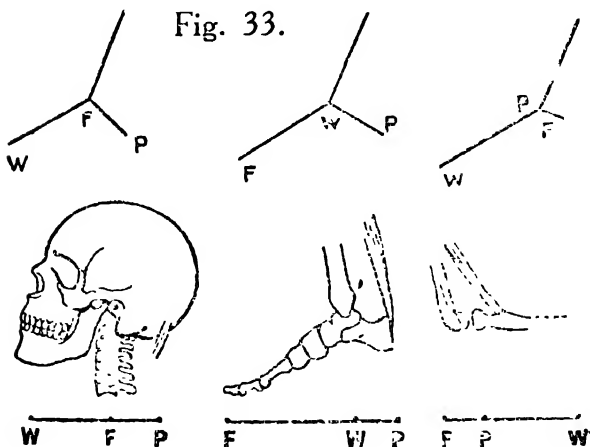
Second order:—

2. (a) In rising on the toes, or tiptoe.
- (b) In hopping, when the leg is off the ground.
- (c) Nut-crackers.

Third order:—

3. (a) The movement of the lower jaw.
- (b) Bending forearm towards the shoulders.
- (c) Raising the ribs by the intercostal muscles.
- (d) Bend the leg at the knee-joint.
- (e) Straighten the leg at the knee-joint.

Fig. 33.



**Summary :—**

A muscle is a bundle of cell-fibres within a sheath of connective tissue. Connective tissue forms into a tough cord called a tendon. Tendons bind the muscles to bones. Ligaments running cross-wise, keep the tendons in place close to the bone, without allowing them to move away or swell out and rise up. Muscular contraction makes movement possible. Muscles are in pairs, one muscle working against the other. The function of a muscle is (1) to move the body, (2) offer protection to internal organs, nerves and blood-vessels and (3) bind the bones. Voluntary muscles obey the will and involuntary muscles are independent of it. Co-ordination of movements in physical exercises increases efficiency and economises energy.

The systematic training of muscles brings about a harmonious development of body and mind. Movement of muscles generates heat. There is combustion and oxidation going on in the tissues.

The waste products resulting thereby are excreted from the system through the kidneys, skin, lungs and the intestine. By a mechanism of levers, all the bodily movements are made possible with variety, rapidity and range of movement.

**Questions :—**

1. How are muscles formed ?
2. What is their function ?
3. Explain clearly.
  - (a) The Co-operative Antagonism of muscles.
  - (b) The Co-ordination of movements.
  - (c) Voluntary and Involuntary muscles.
  - (d) The Master Tissues of the body,
4. Explain and give examples of three kinds of levers.
5. Name the chief muscles of the following parts ;—
  - (a) The thigh and leg. (b) The back. (c) Chest,
  - (d) Hand. (e) Foot. (f) Palm. (g) Neck,

## SECTION 5.

### THE CIRCULATORY SYSTEM.

The heart, the blood vessels and blood form the circulatory system.

The work of this system can be divided into four distinct kinds, namely—

- (1) Receiving impure blood from the whole body.
- (2) Passing this blood into the lungs for its purification.
- (3) Receiving purified blood from the lungs into the heart.
- (4) Pumping the purified blood from the heart to nourish the whole body.

The above work is accomplished by two acts—

- (1) Contraction or Systole and
- (2) Dilatation or Diastole of the Heart.

The systole and diastole are not haphazard acts. They are rhythmic. A cardiac cycle is composed of systole and diastole and it is repeated 70 times a minute. The heart-beats that we experience under the left nipple, is due to the shock given by the contracting ventricles.

Our System of Psycho-Physical Culture, on account of its simplicity, variety and co-ordination of movements, coupled with breathing exercise and mental training, has a very salutary effect on the magnetic flow of the blood current.

### BLOOD.

Our blood is the stream of life. All the food products are divided into their finer elements, sugar,

nitrogen, oxygen, etc., and stored up in the blood. The blood as it flows through the muscles, feeds the cells in them, and helps their growth. The same blood while passing through the blood vessels, nourishes them and strengthens them. In the liver, for example, in addition to the preparation of the bile and the repairing of the gland itself, the surplus sugar, in the shape of glycogen in the blood, is extracted and stored up. The liver removes also some harmful bodies which enter with the food. In the thyroid gland, another kind of secretion which is stored up, helps the physical and intellectual development of the human species.

Blood should not be too thick or too thin. It should contain certain proportion of red blood corpuscles and the white blood corpuscles. It should be free from germs of disease. It should be deprived of certain impurities that get into it during its circulation in the body, by elimination of waste products through perspiration, urine and excretory matter from the system. The weight of blood is about one-thirteenth of that of the whole body. The peculiar quality of the blood is that it is saltish in taste and has got the property to change into a solid mass, called a clot, as soon as it comes in contact with air. This process of clotting of blood, helps the stoppage of bleeding automatically, by clogging the torn opening of the blood vessel.

The heart weighs about 10 to 12 ounces in the adult male and 8 to 10 ounces in the female. It is Fig. 37 to be noted that it is about  $2\frac{1}{2}$  inches in thickness,  $3\frac{1}{2}$  inches in girth and  $4\frac{1}{2}$  inches in length.



Fig. 27

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## LIST OF CHIEF MUSCLES NECK ARMS AND TRUNK

1. Sterno-Cleido-Mastoideus
2. Levator Anguli Scapuli
3. Splenius
4. Trapezius
5. Pectoralis Major
6. Obliquus Abdominis Externus
7. Serratus Magnus
8. Latissimus Dorsi
9. Rectus Abdominis
10. Deltoids.
11. Triceps.
12. Brachialis Anticus
13. Biceps.
14. Supinator Longus.
15. Extensors (Carpi Radialis Longus, .
16. Flexors (Carpi Radialis).

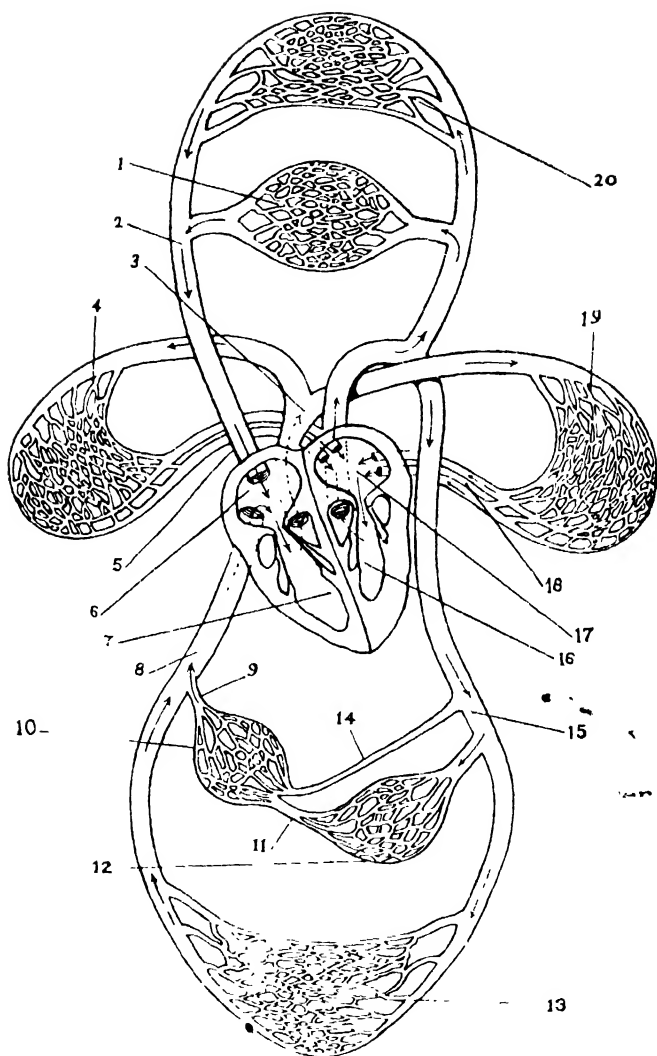


Fig. 36

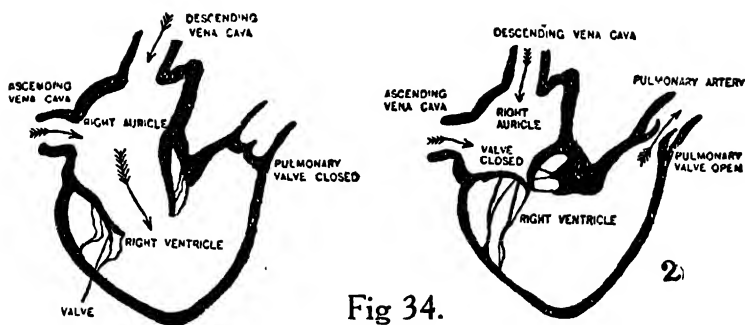


Fig 34.

The muscle fibres of the heart are involuntary, and act without the intervention of the human will. The heart is divided longitudinally by a muscular wall. These two sections of the heart, do not communicate with one another. Each section is further divided into two chambers; the upper chambers are called Auricles and the lower ones, Ventricles. So the right section is divided into Right Auricle and Right Ventricle, connected with each other by the Tricuspid Valve. The left section, is divided into the Left Auricle, and Left Ventricle, communicating with each other, through the Bicuspid or Mitral valve.



Fig. 35.

Arteries are thin tubes of blood-vessels that carry pure blood from the heart. Veins carry impure bluish blood to the heart. Veins have tiny valves to prevent the blood from flowing back. In Figs. 34, 35, blood flows towards the arrow mark, through a valve. Capillaries (capillus means hair) are microscopically thin hair-like vessels, which serve

as the connective links between the ends of arteries and the beginnings of veins.

The Auricles receive blood into the heart, and Ventricles send out blood from the heart. The course of blood from the heart may be traced as follows :—

1. From the Left Ventricle into the Aorta and its branches. See Fig. 36, No. 16.

2. Thence into various parts of the body, No. 15.

3. Then gather together through the Capillaries into the two Veins, called the Superior and Inferior Vena Cavae. Nos. 2, 8.

4. From these two Vena Cavae into Right Auricle (R. A.). No. 6.

5. From R. A. to Right Ventricle (R. V.) Nos. 6, 7.

6. From R. V. to the Lungs. Nos. 7, 3, 4, 19.

7. From the Lungs to L. A. (Left Auricle). Nos. 4, 19, 18, 17.

8. From L. A. to L. V. (Left Ventricle), Nos. 17, 16.

The Auricles contract together at the same time and the Ventricles contract subsequently.

What happens when the Auricles contract ?

When the R. A, 6, contracts, the venous blood in it, gets into the R. V, 7, through the tricuspid valve.

When L. A. 17, contracts, the arterial blood flows into the L. V. 16, through the bicuspid or mitral valve.

That is both Auricles have emptied themselves into the Ventricles.

What happens when subsequently, the Ventricles contract ?

When the R. V, 7, contracts, venous, impure blood is pumped into the lungs, through the Pulmonary artery, 3, for purification. When the L. V, 16,

contracts, fresh and pure blood, is pumped into the Aorta, for nourishing the whole body.

What is the pulse due to? When the left Ventricle contracts and forces the blood into the Aorta, the Aorta expands its elastic walls to receive the blood stream and subsequently relaxes and returns to its original calibre. The onward jerk that is given and its subsequent recoil, constantly repeated, form a wave-like movement, giving birth to what we call, the pulse. It is felt only in the Arteries and not in the veins or capillaries. It is not felt in the Pulmonary artery which does not contain Arterial blood. The blood flows roughly at 16 inches per second. At this rate, it covers a distance of one mile for one hour and two minutes.

Pulse-beats vary according to sex, size and age.

Average male	70	Female	80
At birth	140	Infancy	120
Youth	90	Adult	75
Extreme age	75-80.	Old age	70

During hard exercise up to 180.

When standing, it is about 82, sitting 72, and lying down in a relaxed condition, about 65 per minute.

Arterial blood is fresh blood, charged with oxygen taken into the lungs. Venous blood is impure blood carrying the wastage in the system.

If the heart stops its action, life comes to an end. Fig. 37. There are two kinds of beats of the heart, called, Lupp, Dupp. The heart works without rest, day and night, and the only rest it takes, is between the interval of the two sounds,—Lupp, Dupp. The action of the heart remains healthy, if proper exercise

is taken regularly. It has already been noted that the blood consists of plasma the liquid part and the corpuscles—Red and White ones.

Red corpuscles are the oxygen-carriers in the system. White corpuscles are the soldiers that attack and kill disease germs. Haemoglobin is the pigment which gives the red colour to the red corpuscles. It is this haemoglobin that readily mixes with oxygen gas.

Hematin + Globin = Haemoglobin (Protein body).

**Lymph** :—Plasma contains the various food



elements and salts dissolved in it to nourish the cells. When this liquid plasma oozes out of the capillaries through their walls and gathers in and around the cells, it is called Lymph.

Lymph is formed by filtration of the blood plasma through the thin

Fig. 37.

capillary walls. Lymph plays a very great part in the body. It takes nutritious salts and food elements from the blood and supplies them to the cells and at the same time extracts the impurities from the cells and puts them into the blood stream. Every moment, food and oxygen is supplied to the cells and every moment the poisonous wastes that gather in the system are removed and put into the blood as venous blood.

Physical exercise will greatly influence the circulation of blood in the system. If the exercise is too much, it has a bad effect on the heart and lungs. The heart especially becomes weaker by over-exertion. Most of the students who are examined by us, showed what is termed the "Foot-ball heart" meaning thereby, rapid beats, nervousness and dilatation.

### **Summary:—**

Blood consists of Red and White corpuscles. Red ones carry oxygen, white ones serve as soldiers or scavengers to kill foreign germs. The liquid portion of blood consists of plasma. Lymph is formed by filtration of the blood plasma through the thin capillary walls.

Arteries carry pure red blood. Veins carry the impure bluish blood. Capillaries are hair-like thin vessels between arteries and veins. Heart pumps the blood to the whole body. It has four chambers, the upper ones, are called Auricles and lower ones, Ventricles. The heart, the blood vessels and blood form the Circulatory System.

### **Questions:—**

What is blood? What is the circulatory system? What is the function of 1. Arteries. 2. Veins. 3. Capillaries. 4 Lymph. 5. Red Corpuscles. 6. White Corpuscles.

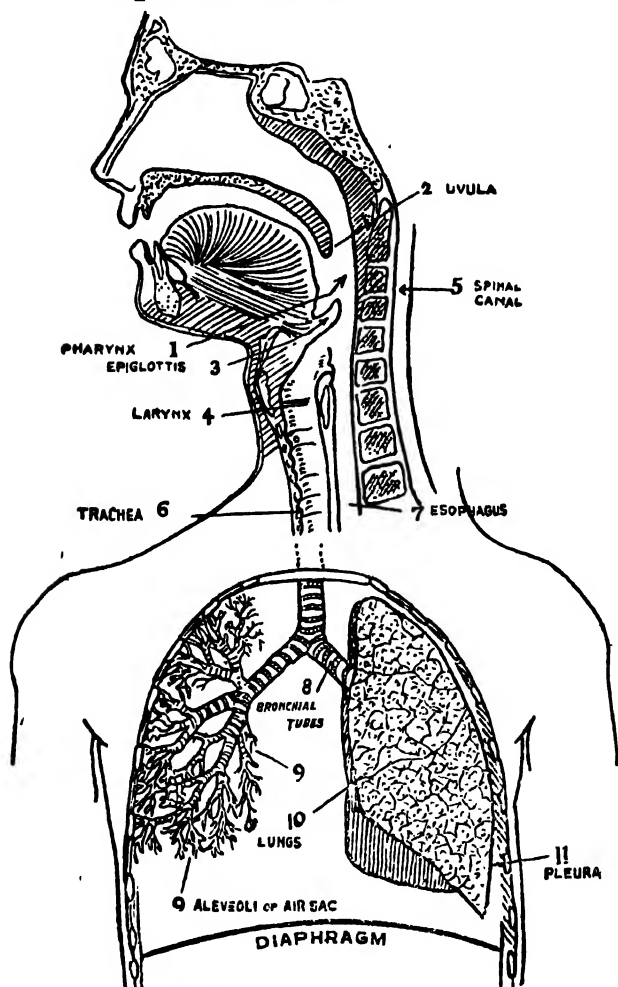
What are 1. Systole. 2. Diastole. 3. Pulse. Describe the Heart and its chambers. Describe the course of blood from the left Ventricle to left Auricle of the Heart.

## SECTION 6.

### THE RESPIRATORY SYSTEM.

The act of breathing is called respiration. It consists of two parts:—

1. Inspiration, taking oxygen-charged air into the lungs.
2. Expiration, giving out of the lungs air, charged with carbon dioxide.



Figs. 38, 39, 40.

Inspiration is the result of muscular effort.

Expiration is the result of the elastic recoil of the lungs to reassume its natural dimension.

After expiration there is a pause before inspiration begins. The organs involved in breathing air, are (*a*) the nose, (*b*) Trachea or the air tube, (*c*) the lungs, (*d*) the Thoracic muscles and (*e*) Diaphragm. Inspiration is accomplished by the diaphragm and the inter-costal muscles. Figs. 38, 39, 40.

The Thoracic cavity is divided into three sections each separated from the other by partitions of thin connective tissue, called the Pleura No. 11 which closely surround the outer walls of the lungs. On either side of this cavity, there are the Right and Left lungs and in the middle section, the Heart is suspended like a pear, with its apex downwards. Fig. 37. The Diaphragm is a flat muscular wall forming the floor of the thoracic cavity and the roof of the abdominal region. Fig. 40.

Have you seen a sponge? It is full of honeycomb passages. Lungs are constructed similarly. The right lung has three lobes and the left only two lobes to make room for the heart which is situated on the left side. Fig. 37. These honeycomb passages, called Alveoli or air-sacs, are filled with a net work of thin capillaries or blood vessels. These capillaries contain the impure blood carried into the lungs by the pulmonary artery. The oxygen in the air we breathe, comes in touch with the impure carbon particles in the venous blood and carbon dioxide is formed. This carbon dioxide is a poisonous gas and it should be eliminated as early as possible.

So when we breathe out, this is thrown out along with vapour, mucous, heat and foreign material from the system. What happens in the lungs ?

The air we breathe, parts with its oxygen in the bronchial tubes and forms carbon dioxide. The venous blood sent into the lungs loses its carbon impurities, water and heat. So the air in the lungs comes out vitiated with carbon dioxide, impure water, mucous, heat and foreign matter, if any. The blood in the lungs becomes purified into arterial blood and passes off through the four pulmonary veins into the heart.

But in addition to this process of purification, something more happens here. We have already referred to the Red Corpuscles in the blood as the Oxygen carriers. There is a pigment called Haemoglobin in these corpuscles which give the red colour to the blood. Plasma in the blood is almost colourless. It is the presence of Haemoglobin in the Red corpuscles that gives the blood its red colour. Haemoglobin plays a very important part. It has the property of combining very easily with Oxygen. Hence the blood in addition to the purification it has gone through in the lungs, is further charged and loaded with an additional quantity of Oxygen. Thus purified and loaded with oxygen, the arterial blood goes into the system amongst the cells of the body, where the haemoglobin readily gives up its extra oxygen contents to the hungry cells of the body. Chemical Action goes on between the cells and Oxygen.

The act of respiration is governed by a centre in the medulla oblongata. Though involuntary, this centre is to some extent, under the human will.

### LUNGS.

The vital capacity of the lungs in health is equal to 225 to 250 cubic inches, and it can be divided as follows:—

1. *Tidal air* is about 30 cubic inches.

(This is, that portion which is going in and out generally.)

*Stationary air*, is air, remaining in the lungs after an ordinary expiration.

2. *Complemental air* is 120 cubic inches.

This is what we can take, in addition to the tidal and stationary air by a special effort.

3. *Supplemental air* is 100 cubic inches.

This is held in reserve by us during ordinary breathing. The above three total up to 250 cubic inches—There is further yet another called

4. *Residual air* of about 100 cb. inches which cannot be breathed out by converting the space in the lungs into a vacuum.

It is necessary to breathe through the nose as the air in this case gets warmed by going through the passage of the nostrils; it is moistened and filtered there before getting into the lungs. The average man breathes from 14 to 17 times per minute. The air which a person can breathe out from his lungs by a forcible expiration after the deepest inspiration possible, indicates the *Vital Capacity* of the lungs.

The air we breathe is a mixture of oxygen and nitrogen. Nitrogen is used to dilute oxygen, because it cannot be taken in its pure and free condition. There is an admixture of 21 per cent of oxygen, with nearly 79 per cent of nitrogen in the air we breathe. If the air contains less than 17 per cent of oxygen, it is not fit for human consumption. A place where oxygen is only 12 per cent, is really a dangerous one to live. By keeping the windows closed in rooms where people sleep, the air therein gets vitiated by the exhalations and is certainly unfit.

This air starvation brings in its wake many diseases of the lungs.

The one effective and cheap remedy, is pure air.

The nose with its two openings, the nostrils, are specially constructed to warm the air and obstruct the entry of dust and foreign matter. The following (see Fig. 38) meet in a common passage called the pharynx (1); nose, mouth, gullet, eustachian tubes and the larynx (4) guarded by the sliding lid called the epiglottis, (3) which allows only air to get into the opening of the larynx and not food or water. Further down the larynx, commences the windpipe called the trachea, (6) which is divided into two bronchi, (8) each bronchi entering into its own bunch of lungs, (10) where they go on dividing themselves into very minute bronchioles, and each bronchiole leading into a cluster of lung cells or Aelveoli. (9) The passage of air into the lungs may be traced as follows:—Air enters first through the Nostrils, secondly into the Pharynx, (1) thirdly Larynx (4), fourthly

Trachea (6), fifthly Bronchi (8), sixthly Bronchioles and seventhly into Aleveoli (9). Schema, 38, 39, 40.

It is in the Aleveoli that oxidation takes place. Carbonic wastes are removed from the blood and oxygen is added to it. This is the physiology of respiration. But there is a higher aspect of breathing, which goes by the name of Pranayama, which consists of three distinct stages:—

1. Poorakam—Inspiration. 2. Kumbakam—Retention. 3. Reychakam—Expiration.

It is through the control of the breath that man learns to control the Prana or the Primary Mother-Force in nature from which originate many secondary forces.

“The Yogi perishes by over-eating, hard physical labour, too much talk, observance of vows, promiscuous company, and a greedy stomach.”

“The Yogi succeeds by cheerfulness, perseverance, courage, true knowledge, firm belief in the words of the Guru, and by abandoning company.

“When the breath wanders, that is, is irregular, the mind is also unsteady; but when the breath is still, so is the mind, and the Yogi lives long; so one should restrain the breath. ‘A man is said to live only as long as he has the breath in his body; when the breath goes out, he is said to be dead. So one should practise Pranayama.’

“Sushumna is the Spinal Cord, and the term is used in various ways to express the state of equilibrium between the positive and negative aspects of Prana or Force. Pingala is the positive current,

flowing along the right sympathetic nerves, through the right nostril. Ida is the negative current, flowing along the left sympathetic nerves, through the left nostril. Kumbhakam is retention of breath after full inspiration (Purakam), or after expiration (Reycha-ka). Unmani Avastha is perfect Concentration.

“As we tame lions, elephants and tigers gradually, so also should Prana be brought under control, else it will kill the practitioner. The practice of Pranayama frees one from all diseases. By mistaken course of Yoga, the Yogi brings upon himself all diseases. By a wrong course of Pranayama, the breath becomes deteriorated, and hence cough, asthma, pains in the head, eyes and ears, and various other diseases. He should gradually inhale the breath, and as gradually exhale it ; he should also restrain it gradually. Thus it is that a man obtains Siddhis (Power).”

**Summary:—**

Respiration consists of Inspiration and Expiration. Inspiration is taking in and Expiration is breathing out air. Respiratory system consists of the Nose, Trachea, Lungs, Thoracic muscles and Diaphragm.

Oxygen in the air breathed in, comes in touch with the carbonic impurities in the venous blood, and the result is that blood loses its impurities and becomes pure blood and air loses its oxygen and becomes impure air with carbon dioxide. Pure blood is sent to the heart and impure air is breathed out.

**Questions:—**

What is Respiration,

Explain (a) the structure of the lungs, (b) the Physiology of breathing. What is the Vital Capacity of the lungs ?

Explain—Tidal air, Stationary air, Complimental air, Supplemental air and Residual air.

## SECTION 7. THE DIGESTIVE SYSTEM.

The food we take is broken mechanically and ground down by the teeth and made into an assimilable mass, (ad = to, similis = to make like), by the action of various juices, at different stages, so that the nutritive portion is absorbed and assimilated into the system. (1) Digestion means preparing the food to be fit for absorption. (2) Absorption means, sucking in through special apparatus, the intestinal villi, Fig. 42, the nutritious portion of the food and putting them into the blood current, to feed the cells of the body. (3) Assimilation consists in the conversion of food-elements by cells of the body into their own use. A number of organs are concerned in digesting and assimilating the food we take. These organs form the Digestive System. 1. The Mouth, 2. Pharynx 1, Fig. 38. 3. Esophagus, 4 Stomach, 5. Small Intestine, 6. Big Intestine. Schema 43. These are connected with one another by means of the Alimentary Canal (alere = to nourish).

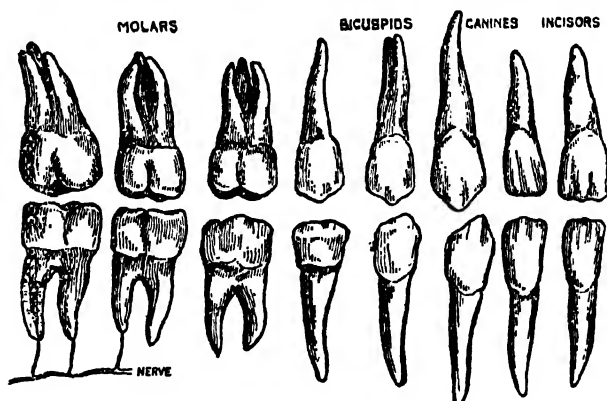
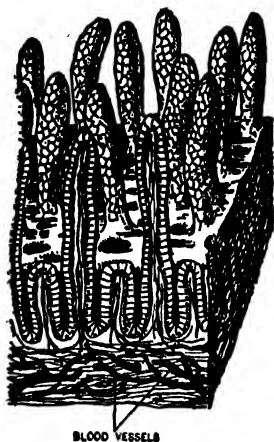


Fig. 41.



Villi, Fig. 42.

## THE ALIMENTARY CANAL.

It is nearly 30 feet in length. See figure 43—It begins with (1) The Lips, (2) Opening of the mouth; then comes the (3) Pharynx (Throat), (4) The Esophagus (Gullet), which opens through (5) The Cardiac gate of the stomach, into the cone-like pouch, (6) The stomach. Then it opens out through the Antrum Pylorus passage of the stomach, into (7) The Small intestine, called Duodenum, which runs in a zig-zag way and is 20 feet long. Further proceeding, it is changed into the Big Intestine. This junction of the small and big intestine is called (8) The Vermiform appendix or the Ileo-cecal sphincter. (9) The Big Intestine takes an upward course to the liver side and it is here called (10) The Ascending Colon. It then turns to the left hand side of the body, running below the pancreas and at this stage, it is called (11) The Transverse Colon and then, near the spleen region, it descends down under the name of (12) The Descending Colon with the sigmoid flexure, until it ends with the rectum and the anal opening.

In this connection we should not forget the most important part played by the Liver; the Pancreas and the Spleen, of which the first two are connected with the Alimentary canal through special ducts. The liver secretes bile, the Pancreas, Pancreatic juice, and the

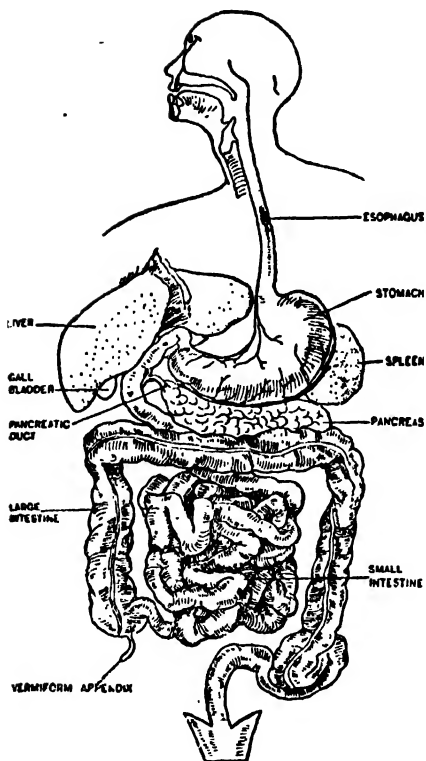


Fig. 43.

The food acted mechanically thus by the teeth and chemically by the saliva, is made into a soft mass, called the bolus, which is then thrust into the Esophagus or Gullet through the pharynx or throat.

Here, there is a lid called, the Epiglottis, which closes the air passage, called the Larynx, thus enabling the food to slip into the gullet and reach the Cardiac sphinctre of the stomach, which opens and receives the food into the stomach. See Fig. 38.

intestines secrete the intestinal juice and all these juices are poured into the Duodenum by their respective passages.

What happens with the food we take is this:—The food is mechanically broken and ground down by the teeth. Fig. 41.

Then it is chemically acted upon by the Saliva which converts the starchy portion into glucose or sugar. 1 and 2 are salivary glands in Fig. 44.

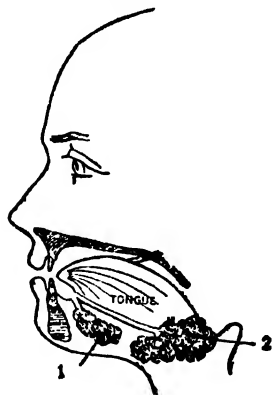


Fig. 44.

The upper gate of the stomach is called the Cardiac opening. The expansion of the stomach after this opening is called the Fundus, then comes the Intermediary section between the Fundus and the lower end of the stomach which is called the Antrum Pylorus, through which the food is passed out of the stomach into the small intestine, called the Duodenum.

In the stomach, the food is acted upon by gastric juice, coming out of the gastric glands. It is here rolled about by the peristaltic waves of the walls of the stomach and thereby reduced into a thin gruel, called the chyme; and this chyme, as it is being formed, is expelled from the stomach, into the Duodenum, from time to time, by the relaxation and opening of the pyloric sphinctre, and subsequently its contraction, at intervals. All the contents of the stomach are not expelled at once. The watery portion is ejected earlier than the semi-solid portion.

When all the contents of the stomach are expelled, the stomach shrinks down and rests for sometime. If we are at rest or asleep, this resting period is prolonged. If we are regular in our habits, the stomach also becomes very regular in demanding food. After an interval of rest in the usual course, it demands food. This demand is felt by a peculiar sensation in the stomach rising up to the throat through the esophagus. This is called hunger. At the sight of food, the mouth begins to water or pour out saliva. This is the sign of real hunger.

### FOOD.

Food is that which nourishes our body. There is consumption and oxidation going on in the system

and food supplies the wastage of our body. Food is derived from the animal and vegetable kingdoms. A substance may have nutritious particles in it, or be an agent of giving energy. But this is not sufficient by itself. Kerosine oil yields energy, yet it is not human food. Coal has carbon in it, but it is not fit for human consumption. A substance to be a food, must contain the following qualities:—

1. It must be easily soluble.
2. It must be capable of supplying materials that are required to build new cells.
3. It must yield energy.
4. It must not injure the cells in the system.
5. It must not impede the natural working of the various organs.

All the foodstuffs that we take, come under one or the other of the following technical names:—

1. Carbohydrates.
2. Proteids.
3. Salts.
4. Fats.
5. Vitamins.
6. Water.

These substances are composed of very small microscopic parts called molecules. These molecules are again made of still smaller particles, called atoms. A starch molecule, is said to contain nearly five hundred atoms and a proteid molecule, about two thousand atoms. These molecules are split up in the process of digestion and these molecules are changed in such a way, as to dissolve and pass through the intestinal walls into blood.

The different stages of digestion.

*In the mouth*:—1. Saliva acts on the starch contained in the carbohydrates.

*In the stomach*:—2 Gastric juice on the proteids.

*In the Duodenum*:—3. The bile from the liver, pancreatic juice and the intestinal juices act upon the food.

Steapsin acts on fat. Trypsin acts on proteids which have escaped the gastric action in the stomach. Amylopsin acts on the starch which escaped the action of saliva in the mouth. These substances like Steapsin, Trypsin, Amylopsin, etc., which are very essential for splitting the food molecules, are called Enzymes or Ferments. In India we have to be guided by the experience of the race, handed down to us from centuries and make such changes that are necessary according to modern science, because common experience here coincides with science. A wise selection from the following, will be sufficient for a healthy life, only overeating, underfeeding and hasty gulping must be avoided.—Rice, Wheat, Peas, Beans, Lentils, Cereals and Dal (Pulses) of different types and Vegetables, Nuts, Butter, Ghee, Curds, Milk and Fruits.

### **Summary :—**

Digestion consists in mechanically breaking and grinding down food particles and chemically acting on them and making them fit for absorption and assimilation. The teeth, tongue, stomach, liver, pancreas and the intestines form the Digestive System. Food is converted into a thin gruel called chyme. Food is digested by five different juices at five different stages—Saliva, Gastric Juice, Bile, Pancreatic and Intestinal Juices.

### **Questions :—**

What organs constitute the Digestive System ? Describe the course of food explaining the various stages of digestion. Draw a rough sketch of the Alimentary Canal, giving the names of the different sections that comprise it.

What are the chief characteristics of any substance to be fit to be food ? What are Enzymes ?

What are the chemical names under which food materials are classified ? What are the following : Steapsin, Trypsin and Amylopsin ?

## SECTION 8.

### THE EXCRETORY SYSTEM.

Food supplies the materials to build the broken down tissues with new cells. But the whole of the food is not converted wholesale into new cells. In the process of digestion and assimilation, there is some debris or waste matter left behind both from the old cells and from the food materials. 'Secretions are products of glandular activity of picking up some necessary ingredients from the blood. Excretions are the picking up of waste products such as urine, sweat, nasal mucus, etc.' Just as ashes are left behind the coal that is burnt, these wastes are removed from the system in different ways at different stages.

(1) From the lungs, carbon dioxide, water and other things are given out. (2) The skin is always secreting certain impurities in the shape of perspiration. (3) The kidneys separate uria, uric acid, etc., from the blood and pass it through the bladder as urine. (4) The intestines collect all the solid and semi-solid wastages in the alimentary canal and pass them off as faecal matter.

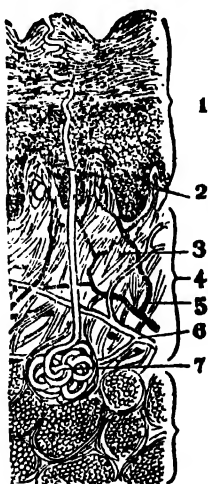


Fig. 45

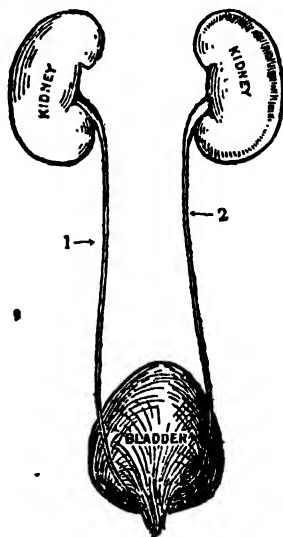


Fig. 46.

All these wastes are poisons to the system, and if they are not removed out of the body, the natural processes of life are interfered with and result in the death of the human organism.

The excretory organs can be helped by the cleanliness of skin, fresh air, deep breathing exercises, wholesome food, pure water and carefulness in avoiding stimulants and irregular habits.

### CONSTIPATION.

Early morning is the best time to evacuate the bowels and the bladder. Students should acquire this habit at any cost. If the food is not properly chewed, if sufficient quantity of water is not drunk, if you keep late hours and if you are in the bed long after sun-rise, you throw open the gates of health to disease and the first sign of disease, is Constipation. Colitis results from Constipation. It is inflammation of the colon on account of continuous constipation, gulping down food without chewing it properly, overfeeding and too frequent eating. Persons suffering from colitis must avoid meats, eggs, fats, spices, coffee, tea, alcohol, tobacco. Dahi or curds churned into whey (ghol, lassi, majjiga) after the butter is removed, is good for these persons. Thorough chewing, early meals, drinking water one or two hours after meal, and drinking water early in the morning on rising from the bed, taking our special abdominal exercises in empty stomach (see exercises F. L. O.), regular habits, massaging the spine and abdominal region and bath, and giving special and serious attention to Breathing Exercises, will relieve

in due course of time, from that fell disease of Constipation and the fatal pains of Colitis (colic.)

Note the following points for the cure of Constipation as we have cured thousands of the intellectual class, who suffer from it, due to their irregular habits and sedentary and leisure-loving life.

Hygienic rules and routine commencing from the evening time to avoid constipation.

1. Take your meal early, before 9 P. M.
2. Do not drink water during meal.
3. Chew your food thoroughly.  
Eat liquids and drink solids.
4. Drink water half-an-hour before going to bed.
5. Take a short walk or go up and down in your room.
6. Empty the bladder before bed time.
7. Wash thoroughly, face, hands, feet, etc.
8. Lie down reclining to the left side, on your bed, when you go to sleep.  
(Do not sleep on spring cots.)
9. Go on breathing deeply and slowly before going to sleep, and think of God.
10. Turn to your right, about 2 o'clock (A.M.)  
(This habit is acquired through practice).
11. Leave bed at 5 a. m. and drink water. Go through Constipation and Breathing Exercises and Massage—see section on constipation exercises.
12. Sit in the latrine as follows:—
  - (a) Sit resting on the toes, heels raised and and not touching the ground. If it is

difficult to do so, put some broken pieces of brick under the heels. Sitting in this way will not fold the abdominal walls and keep that region free and straight. Consequently no folding is caused in the intestinal region, and evacuation is made easy and effective.

- (b) Put your left palm on the region of the sigmoid flexure as shown in figure and gently press and relax your fingers, just as you press the harmonium, or the working of the bellows.

Try to follow the above routine very carefully and regularly. Even if you do not feel inclined to evacuate the bowels, make it a point to go to the latrine and sit as directed above and in course of time, you will find that you have conquered your enemy and established a new and healthy habit of answering calls of nature, as soon as you rise from your bed.

### **Summary:—**

Just as ashes are left behind burnt coal, so waste products are left behind food combustion and are thrown out by the Excretory organs, such as the Skin, Kidneys, Lungs, Intestines, Lachrymal (Tears) glands and the Nose,

Constipation is due to irregular habits, over, under, frequent or quick eating, indigestion and organic defects.

### **Questions:—**

Define Secretion and Excretion. What are the Excretory organs and describe their function? What is constipation due to? Give some hygienic rules to prevent constipation?

## SECTION 9.

### THE NERVOUS SYSTEM.

Let us take a brief survey of the various organs and glands in our body. The heart is pumping blood with its characteristic sounds lupp-dup. The lungs are taking in air containing oxygen and giving out air containing more of carbon dioxide ( $\text{CO}_2$ ). The lymphatic system is carrying nutrition from the blood to the cells in the body and at the same time, removing the waste matter from the cells and puts them into the blood. The liver secretes bile and stores it up in the gall bladder and when digestion is going on, the mouth of the bile-duct opens into the small intestines, the walls of the gall bladder contract and pour bile into the intestines (Duodenum). The blood is flowing in a continuous stream, supplying the cells of the body with nutrition through the mediation of the lymph surrounding the capillaries and gathering all the wastage in its way and flow into the veins and then into the heart and lungs. The kidneys separate urea and uric acid, etc., from the blood and send their contents to the bladder to be stored up there and passed off as urine.

The thyroid gland, the adrenals, the sebaceous glands—all these are doing their own quota of work in their own sphere. We feel the sensation of hunger and thirst. During day and night, there is going on in the tissues of our body, what is called metabolism or tissue change. In every cell there is wear and tear going on and also there is rebuilding of these broken down tissues.

## IMPULSES.

A few words about how impulses are sent to and from the brain are necessary. There are certain nerves that carry a sensation to the brain or cord. These are only message carriers to the brain and nerves. These are sensory or Afferent nerves. There are other nerves that carry a certain order or command as to what should be done. Hence they are called Motor or Efferent nerves. They carry commands from the brain or cord. When an impulse is carried from a

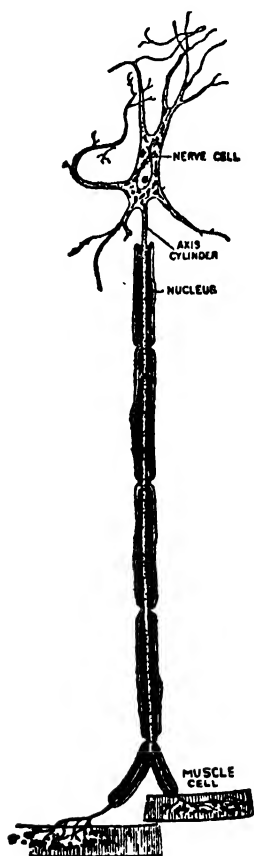
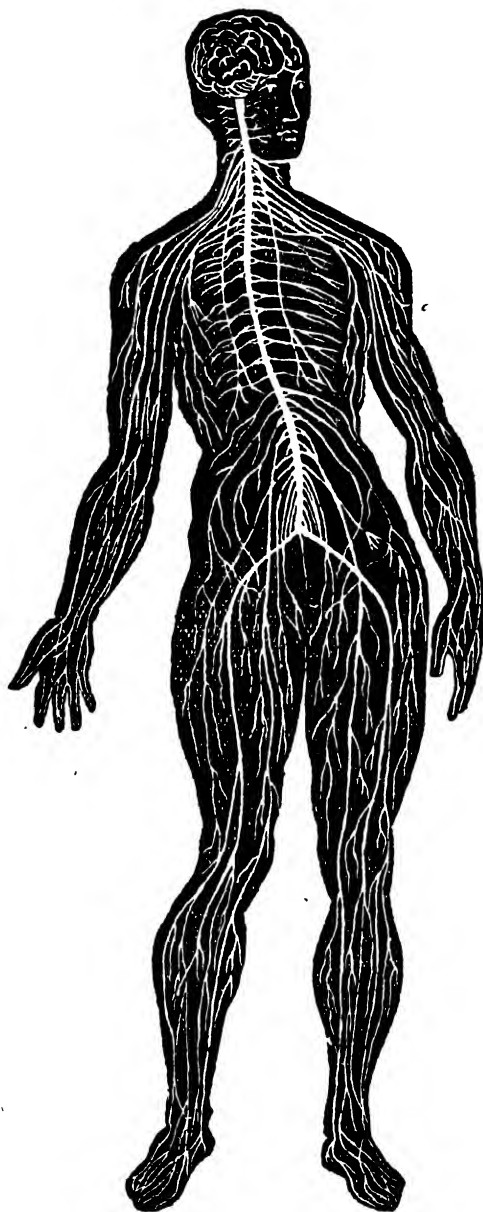


Fig. 47.

muscle to the spinal cord such as the burning of a finger and when this impulse is returned back from the cord to the finger muscles, making the hand to withdraw from the flame, it is called a reflex action. Fig. 51, B.

Muscle fibres are made of a number of cells. It is not so with a neuron. A neuron is not a series of nerve cells. Its structure is a little complicated. Each neuron consists of a cell and an axis cylinder. Fig. 47.

Each nerve cell has a number of branches shooting out like roots and one of these extends into the middle of nerve fibre as the axis cylinder. Both the cell and the axis may be treated as one in substance and are of grey colour. It is this grey axis cylinder that carries the impulses in the nerves.



This figure shows the spinal cord coming out of the brain and sending its ramifications all over the body.

Fig. 48.

There are many kinds of activities going on in our system, some of them through our will and some of them independent of our will. But the point under discussion is, how is this body managed? Who or what controls the whole machinery of the system? What makes the organs do a certain thing at a certain time?

It is the nervous system that controls and works all the organs and muscles of the human body. What is the nervous system?

The nervous system is the ruler of the body. It can broadly be divided into:—1. The Central Nervous System. 2. The Sympathetic System.

1. The Central Nervous System is also called the Cerebro Spinal Nervous System. It includes, (a) the Cerebrum (b) Cerebellum (c) Pons Varolii or the bridge between the two halves of the Cerebellum. (d) Medula Oblongata; all these three forming the brain and (e) the Spinal Cord which is the continuation of the brain into the spinal column along with its millions of branches going all over the body Fig. 48, (f) the twelve pairs of nerves coming out of the brain, called the Cranial Nerves, Fig. 52, (g) the Ganglia and (h) the Spinal Nerve-Trunks. Fig. 48.

2. The Sympathetic System runs on either side of the spinal column, in its outside surface. Fig. 49. Within the spinal vertebrae runs the spinal cord but outside it, run two chains of ganglia or knots of nerves, called in Sanskrit, Granthi. Its function is to control the various internal organs such as the heart, liver, stomach, pancreas, intestines, kidneys, the

thyroid gland, the adrenal glands, the sweat glands and blood vessels. This system carries on the routine function allotted to each organ without always waiting for a command from the central system. The sympathetic system connects indirectly various parts of the body, with the central system. The sympathetic system is, in fact, a part of the central system, but a part which is not controlled by commands sent from the central system. The heart is pumping blood, the stomach is digesting food, the small intestines are absorbing and assimilating food, the kidneys are excreting urea and uric acid and the sweat glands are

sending out perspiration. The sympathetic system controls all these organs and no amount of voluntary effort can stop any of these functions. You cannot swallow food and say to the stomach, do not digest it; you cannot ask the intestines not to assimilate it; or ask the kidneys not to excrete urine. These organs work without our intervention and so their work is called involuntary. But whatever we do with an effort of the mind or will is called a voluntary act. All voluntary acts belong to the region of the brain. Fig. 49.

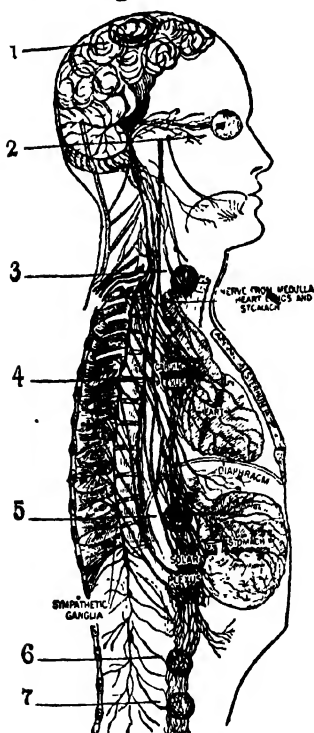


Fig. 49.

1. The Cerebrum is our thinking region. Fig. 50. It is the region of our mind. It can direct the movement of muscles and it receives the sensation from all parts of the body such as hunger, heat, smell, light and sound. It is the most important part of the brain which has almost unlimited scope for development. While it has its own work of control and guidance of the whole body, yet it is left untrammelled for further development of new faculties that man may feel need to develop. It is full of convolutions and has got different sections for different faculties. It is far heavier than the other parts of the nervous system put together. The cord weighs about an ounce, but the brain weighs about 35 to 45 ounces.

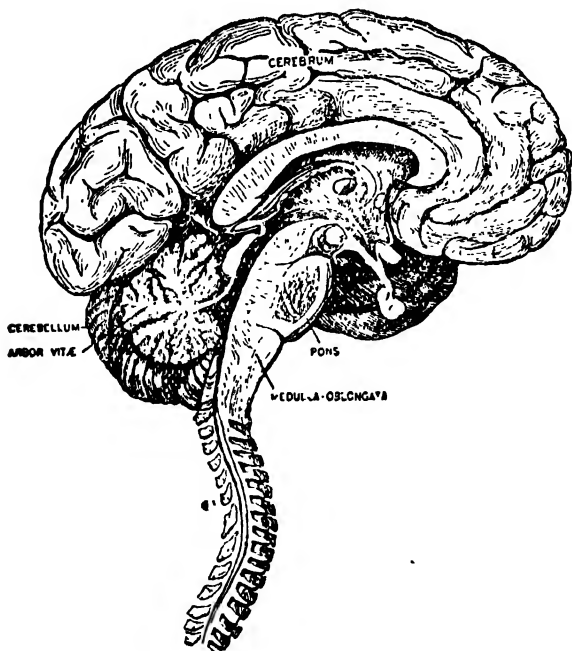


Fig. 50.

This Portion is called *Sahasradalapadma* or the thousand petalled lotus, each petal representing a special field for a special faculty. Languages, music, mathematics, painting, poetry, science and research work, inventions and discoveries, philosophy, logic, great memory, etc., belong to this part of the brain. It is very important for our students to know something of this if they want to develop the brain by practising our system. If the cerebrum is removed, man may live, but without the power of normal thinking. Fig. 50.

The brain has three coverings: (*a*) the outer, *Dura Mater*, (*b*) next, the *Arachnoid* membrane, containing a lubricating fluid to prevent shocks on the brain and (*c*) the inner one, *Pia-mater* with blood vessels to the brain.

2. The *Cerebellum*. Its function is to control the muscles and the co-ordination of muscular movements. It maintains balance in the body. Persons who make their muscles dance, use this part of the brain and those who pay more attention to physical culture exclusively, develop this part of the brain at the expense of the cerebrum and hence do not develop the intellect. Fig. 50.

3. The *Medulla*. It is connected with the cerebrum, cerebellum and the spinal cord. It sends its nerves to the head, heart and lungs. It has the centre of the respiratory act. If the medulla is cut out, breathing stops and death ensues at once. Fig. 50.

4. The *Spinal Cord*. Its function is to receive and send back impulses to and from the brain. It may be considered as an elongation of the brain. It

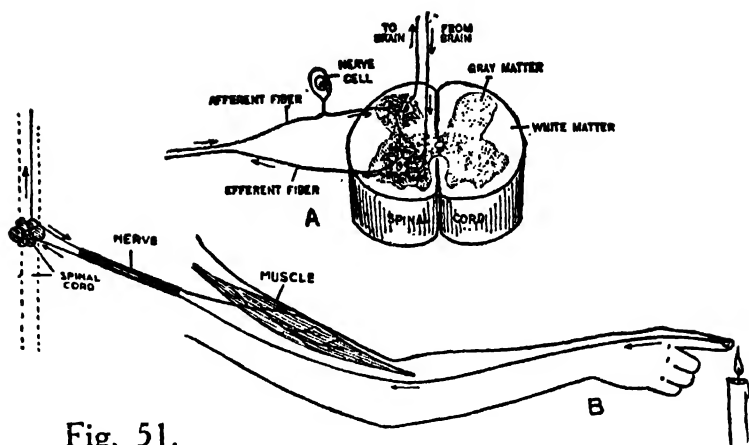


Fig. 51.

is 18 inches long ; it runs within the passage of the vertebrae. Fig. 50. It sends out 31 pairs of nerves. Fig. 48. The spinal cord has the same coverings as the brain. It also acts as a reflex centre from which involuntary actions take place without the aid of the brain at all. If you burn your finger, you withdraw it at once, without your brain sending a command to do so. This is an involuntary act, dictated entirely by the reflex centre in the spinal cord which has not the intelligence of the thinking cells of the brain, but the intelligence of re-action. Fig. 51. There are reflex centres in the medulla and the cerebellum. We may call the reflex centres as a sort of local self-government. The closing of the eyelids during accidents and sneezing when the nose is tickled are reflex actions. The body regulates itself through these reflexes.

### NATURAL AND ACQUIRED REFLEXES.

In the secretion of glands, and digestion and absorption of food in the intestines, we see many reflex actions. When the food reaches the mouth,

the salivary glands eject saliva. When it reaches the stomach, the gastric glands, pour gastric juice. When it enters the intestines, the gall bladder pours out bile ; and the pancreas, the pancreatic juice. All these are natural reflexes. But there are some reflexes which are acquired through constant practice. By repeating an act you make that act easier to be done and it becomes a habit.

### HABIT.

Tea drinking, smoking, scratching the body, all these become bad habits when repeated often and often. Good habits can be acquired and bad habits can be destroyed. Late rising is a bad habit. Passing urine before going to bed at night is a good habit. Sleeping in the day time is a bad habit. So we should be very careful to notice what is a good habit and what is a bad one and carefully avoid to repeat the latter and establish within us only those habits that are desirable for our well-being.

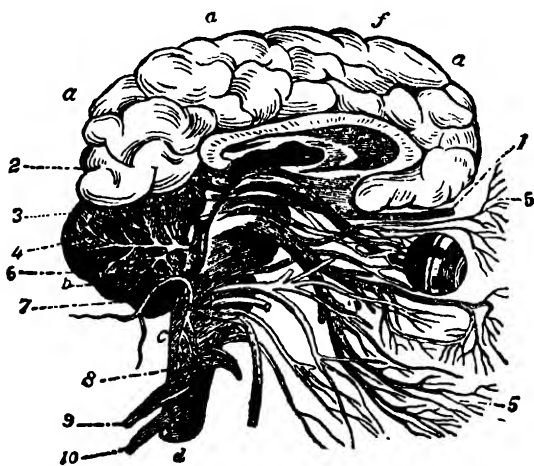


Fig. 52. The Cranial Nerves.

**Summary:—**

The whole body is guided and controlled by the nervous system which is divided into two parts. (1) The Central System consists of Cerebrum, Cerebellum, Medulla Oblongata and Spinal Cord. (2) The Sympathetic System consists of (see Fig. 49) (a) Mooladharam (7), (b) Swadishtanam (6), (c) Manipoorakam (5), (d) Anahutam (4), (e) Vishudham (3), (f) Agneyam (2), (g) Sahasraram (1). You should have a rough idea of these centres, as reference will be made to these often in our exercises.

Neurons compose the nervous system. A neuron consists of a nerve cell and an axis cylinder extending into the middle of the nerve fibre. Fig. 47.

The spinal cord sends 31 pairs of nerves through the vertebræ, and these send their ramifications all over the body. Fig. 48.

We see Natural Reflexes, in the secretion of glands, digestion and absorption of food and excretion of refuse matter. Acquired Reflexes are those resulting from a constant repetition of a certain thing or act.

**Questions:—**

Give a brief survey of the action of the various organs and glands in the body. What controls the activities of the body? What are Afferent and Efferent nerves? What is a nerve composed of?

Draw a diagram of the following: (1) The Central System in the outline of a human figure. (2) The Brain (3) The Sympathetic System. What are Natural and Acquired Reflexes? Give some examples of each.

## SECTION 10.

### WHAT IS PHYSICAL EXERCISE ?

Exercise is work, and willingness to work is a sign of life and its growth. So work or exercise is preparation for life. If work is neglected, life becomes inactive and death is the ultimate result ; but there is some difference between work and exercise as it is now used in this book. All exercise is work, but all work is not exercise. So we use the word exercise in a restricted sense. It means a sort of training or preparation for some purpose. The purpose may be great or small. With some people it may be huge strength or a great body. With others it may be quickness, speed and activity ; while yet there are some who want an average strength, general health, long life, keen intellect and beautiful emotions, with a sociable and serviceable nature.

There are some who say, "Is it not sufficient to walk, run, play and move about as we do in the course of our daily duties ? Should we give a special time for exercise ? What is the need for a special course of physical exercises ?"

To the first question our answer is that it will not do. Why ? Because we do not generally live an active and regulated life.

To the second and third questions, our answer is in the affirmative.

You notice a little baby. How it kicks about and moves its hands as well. What does this indicate ? Nature has placed in us what is called instinct. It

makes us do certain things instinctively. The child when it makes its quaint movements of legs and hands, is taking exercise. It is improving its muscles. It is developing the power of resistance. It is breathing more oxygen. It is getting also habituated to work. It learns to hold and pull, to roll about and sit, crawl on all fours and finally to rise and walk and run. By exercises the bones are fed and become bigger. The nerve centres are also trained to carry out their reflex action and conduct impulses.

Have you noticed a calf? It runs and jumps about in madness of joy. It is gambolling. Why? It feels the need for exercise. Exercise gives the calf pleasure in its bounding limbs and growing organs such as the stomach, liver and intestines, for Motion is Life and Inertia is Death.

So what is exercise?

It is systematic training a man goes through, to get better development and better strength, over and above the ordinary growth which he gets in the usual course of life. Exercise gives an additional impetus in many directions. It aids the fuller growth of bones and muscles. It increases the height and weight proportionately. It hardens the body to resist disease, pain and suffering. It adds more oxygen to the system and purifies the blood current and electrifies it with a new energy. It gives a sort of immunity against breathlessness and fatigue within certain limits. It keeps the body supple and retards old age and its attendant evils, the hardening of the bones and blood vessels, called arterio-sclerosis. It uses up

the reserve materials in the system such as fat and helps the circulation of blood, carrying more nutrition to the cells. It helps speedy elimination of the poisonous wastes that result in the system owing to wear and tear or metabolism in the tissue cells. All the organs of the body such as the liver, spleen, pancreas, stomach, kidneys, bladder and the intestines, all these undergo some changes for better working and better growth through Physical Exercise.

Fernand Lagrange, M. D. says—

“If it has been demonstrated that ‘Function makes structure,’ if work changes the apparatus by the aid of which it is performed, muscular exercise must necessarily produce changes in the brain, an instrument indispensable in the performance of voluntary movement. The nervous working which goes on in the grey matter of the brain for the purpose of throwing muscles into action, must influence the nutrition of this portion of the brain just as much as contraction influences the nutrition of the muscles.”

“The faculty which orders a muscle to act and which gives it the stimulus necessary for its contraction is called the Will: it also is developed and improved by the repeated use made of it. It shows its acquired superiority in the sphere of movement by a greater persistence of effort, by a greater tenacity in muscular action. The person who every day in spite of the different pains of fatigue sustains energetic and prolonged muscular efforts, acquires a greater power of Willing and from this acquisition result certain very striking changes in his moral disposition. The habituation to work gives to a man

greater energy of will considered as a motor force and from this change of a moral order as much as from that of a material order, results a particular form of courage which we may call physical courage.

“Physical courage is manifestly increased by the practice of muscular exercises. It is almost exclusively in men whose daily work is laborious or who are given to violent exercises, that we see bold and energetic actions. If we see in the street a passer-by seize the head of a runaway horse or try to stop a dangerous malefactor we may at once be almost sure that the man is a labourer used to hard work or a sportsman fond of physical exercises. The practice of muscular work and the habituation to bodily exercise, dispose a man to brave all forms of material danger.

“In a celebrated fight between Maffey and Macarthy which lasted four hours forty-five minutes, one of them was knocked down one hundred and ninety-six times before allowing that he was beaten. In another fight one of the champions received in the first round a blow which broke his left arm. He put the fractured limb in a sling and went on fighting for an hour and a quarter till a blow which made him lose consciousness for some minutes, compelled him to allow that he was beaten.

“This incredible strength of Will which enables the prize-fighter to remain firm before such terrible blows, is not derived from anger.

“It is only training that is habituation to violent and prolonged muscular exercise which gives such a

surprising energy to these men whom Royer-Collard declared to be so different from other men."

This is accomplished by physical exercise. Physical exercise, in short, disciplines our body and mind and leads us on to further development both for the improvement of the individual and the advancement of the human race.

Life has become so narrow and mean, that man thinks only of his stomach and the senses. Life is not yet understood as a broad opening for realisation, but as a groove into which selfishness runs to speedy annihilation and effacement. Remember, therefore, that our purpose is not served in living like animals to develop the brute in us. Our existence is meant for Expansion, Evolution and Realisation.

Every cell of our body is capable of these three factors. There is the *Ichhashakti*, *Gnanshakti*, *Kriyashakti* in every cell of our organism. These are the Brahma, Shiva and Vishnu forces operating in and co-operating with the world forces that are seen in man, as *Sat-Chit-Anandam*. So exercise or *sadhana* is necessary to make the body fit, the mind powerful, the emotions harmonious and the Soul, liberated. Our system is not purely physical. It is Psycho-Physical. It is not for developing the muscles only and thus develop the brute in us. It is based upon *Yoga*, a word which means many things.

Exercises may be divided into the following heads according to the result coming out of them.

1. Curative Exercises are those which have the special function of curing certain diseases or mental weaknesses. See F. L. O.

2. Corrective exercises are those that set right malformation, like spinal curvature, drooping shoulders, etc. See F. L. O.
3. Preventive exercises are those that tend to prevent the above two kinds (1 and 2) of defects. See F. L. O. exercises.
4. Recreative exercises are those that create a pleasant sensation in the muscles and nerves, with or without taxing the system. See exercises for girls under head, Dancing steps and Body bending.
5. Constructive and nutritive exercises are those that aid the building up of the body by better assimilation and work. See A, B, C, D, E, PQ exercises.



Fig. 53. Spinal Curvature.

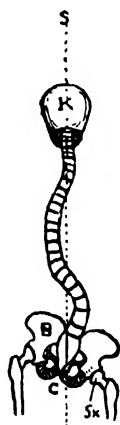


Fig. 54.

## SECTION 11.

### DIFFERENT EXERCISES.

If we want to know what exercises should be done, and what not, we have first to see and examine the expenditure of energy and the quantity of work resulting from an exercise. This is no doubt a difficult task. For example when a person from his standing position, sits down quickly, he only relaxes certain muscles. But if he sits slowly, as is required in the first exercise, A, in our system under the head, "Springing" a greater number of muscles are exercised and different muscles of the thigh are brought into action at different angles. The action of sitting is the same in both the cases, but the quantity of work done is quite different. The amount of work in question depends upon the nature or kind of work done. Nature of work does not indicate merely the slowness or fastness with which a work is done. It also denotes the various methods of an exercise. It may be a simple exercise or it may be complicated. Yet there are some which are not only complicated but very taxing and require a combination of skill, strength and endurance, demanding attention and serious thought even.

See Exercises A and B in the book, as examples of simple movements.

Our combination exercises are a little complicated. They require attention and thought combined with adjustment and harmony. See combination C. D. and A. B. C. D, in this book.

Dands are complicated exercises and require sufficient strength to lift the body from the ground. They belong to the violent type if they are done rapidly and more in number. Exercises done on the rings, trapeze, horizontal bars are hard, but not violent, if they are done within certain limits. Running fast is a violent exercise, but walking is not so. Boxing is a violent exercise. The Indian wrestling is the most violent of exercises. But both Boxing and wrestling require great skill and quickness combined with extraordinary endurance and strength.

We shall for the sake of clearness study them under three broad classes ;—

**I. Physiological.** (a) Natural, (b) Gentle, (c) Moderate, (d) Violent.

**II. Psycho-Physical.** (a) Strength, (b) Endurance, (c) Speed.

**III. Professional,** such as (a) Wrestling (b) Boxing (c) Weight-lifting (d) Circus Feats.

**1. Physiological.** (a) Natural Exercises :—

All natural movements that we make in the course of our daily life, if they are within certain limits, contribute towards exercising our system. In fact almost all the organs and parts of the body are exercised in this way. The eyelids are exercised in winking, the nose and lungs in breathing, the hands in eating, holding and lifting, the legs in walking and the whole body in rising, sitting and lying down. The diaphragm and abdominal organs are also likewise naturally exercised.

But there is a good deal of unnecessary wastage in our movements. Many wink their eyelids unnecessarily and this ought to be avoided. Again, youngsters often go on scratching their body while reading. They also assume all kinds of crooked attitudes of sitting and lying down, biting the lips or shaking the legs. All these unnecessary movements can be avoided.

### (b) GENTLE EXERCISES.

A degree above this, come what are called easy, gentle or mild exercises. Here, exercises properly so called begin, as they are not left to nature or chance but are arranged and systematised with a definite purpose. They are called mild if they produce a pleasant sensation of feeling fit and do not tire you down, that is, do not bring great molecular disturbance through chemical action. There is neither fatigue nor breathlessness, the respiratory movements are increased, the heart action becomes greater, temperature rises, but the muscles do not get tired out and refuse to work as in fatigue.

When the muscles are filled with nitrogenous wastes owing to overwork, they get poisoned and their power to contract is affected and this is called *fatigue*.

Breathlessness is panting for breath. The system requires more oxygen. You take breath, meanwhile there are more accumulations of poisonous wastes and they are thrown out and so breathing in and out, go in rapid succession, but the quantity of poisonous

wastes increase more than they are eliminated and hence the condition of breathlessness. So fatigue and breathlessness measure, to a great extent, the mildness or hardness of an exercise.

#### (c) MODERATE EXERCISES.

In the next class of exercises which we have called moderate, there is not much of breathlessness, but there is some amount of local fatigue, that is, in the local parts that are directly involved in the exercise. These exercises are moderate in their reaction upon the body. They are somewhat hard, if their speed is increased or if they are prolonged for a longer period.

#### (d) VIOLENT EXERCISES.

Then the last kind of exercises come under the classification 'violent,' and are very hard exercises. Here are experienced both fatigue and breathlessness. If these exercises are done to a limited extent, it is good for the system, as they produce those virtues desirable in every human being, namely, resistance and endurance, known generally as Spartan Hardihood. But if these are carried a little beyond a certain standard, then some accident of muscles or lungs or heart-trouble may result. If carried further still, death will result as in the case of race horses.

We cannot close this discussion without summing up all these ideas in the masterly words of that great physiologist, Fernand Lagrange.

"When after an exercise a man of average strength has experienced neither fatigue nor breathlessness, the exercise may be called Gentle.

When the exercise has caused local fatigue without inducing breathlessness, it will be Moderate.

It will be called Violent, when it is accompanied and followed by breathlessness."

This division is not based upon the difficulty of the exercise but on the physiological reaction of the exercise on the system. Now this reaction is always in the same person, in proportion to the quantity of work performed by the organs in a given time.

In the case of simple exercises, the urine is almost normal. But on the other hand, after hard exercises, urine reveals a greater amount of sediment of phosphates, calcium, albumins, etc., which means wastages that take place in the system.

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## SECTION 12.

### THE UNDERLYING PRINCIPLES OF MOHUN'S PSYCHO-PHYSICAL CULTURE.

Practise our system before a big mirror, the only instrument we prescribe in our method of culture. There are five aspects of our system for five different purposes.

- (1) **Physical Grace.**—Do the exercises without any strain, in opposition to the principle of vibration and concentration during muscular contraction. Let your movements exhibit a sustaining rhythmic motion, and perfect balance, easiness and grace. Feel intensely that you are a picture of Beauty, Poise and Rhythm. Admire yourself.

(II) **Muscle Building.**—This is to develop muscles by separate exercises for separate parts of the body, so that while one part is exercised, the other part may be in a relaxed condition. The object is to save energy and combine efficiency with economy. Do 20 movements at the rate of 10 per minute. Think of Symmetry, Strength and Health, but not of a huge body.

(III) **Organic Strength.**—To strengthen the organs such as the liver, kidneys, spleen, etc., by means of pressure, rubbing or kneading (1) through physical exercises or (2) by means of sending mental impulses or currents of suggestion. Do 10 movements.

(IV) **Nervous Development.**—By training and educating the plexuses or nerve centres, we establish greater sympathy between the nervous system and the organic, vascular and muscular systems. Do 5 movements.

It is a new method of developing intelligence, consciousness and individuality in the nerve centres. Discipline leads to development.

Sending an impulse means sending a message or a current of thought, that is, feel that actually some force charged with your suggestion is going on in its mission. Plexuses are groups of nerves controlling the functions of some organs, glands, etc.. Each plexus must be conceived as a battery and by exercises and impulses you charge the battery with power. For plexuses see Summary, page 98.

**(V) Brain and Faculty Building.**—This is a process by which you build the mind with the material of your mind. Feel intensely that man is mind, that the body is concrete mind ; that the nerves in the body are but the extension of the brain ; that the nerve cells are endowed with intelligence. Believe that everything is mind and build everything with the mind. Do 5 movements. "A stimulus to nervous matter effects a change in the matter by calling forth a reaction in it. This change may be exceedingly slight after the first stimulus, but each stimulus increases the change, with its following specific reaction, until by constant repetition a permanent alteration in the nervous matter stimulated occurs, which produces a fixed habitual way of working in it. In other words, the nervous matter acquires a special way of working of function by habit."

Keep these five aspects before you when you practise our system of Psycho-Physical Culture. You may do each exercise for a particular aspect or you may combine one or more aspects. It is easy to combine the first three aspects—Physical Grace, Muscle Building and Organic Strength. As for the IVth and the Vth aspects, it is better to do them separately. Special Application is given under each exercise, as regards the last two aspects.

See Figs. 49 and 55, for the plexuses referred to in the exercises. Keep a rough idea that these plexuses are self-charged batteries placed in the body. Your attempt is to strengthen, educate and charge each battery with power and energy to act as our will dictates. You must not doubt but you must believe and affirm what you will to do.

We draw the attention of the reader to the great physiological truth we have given expression to, namely, "Function creates structure." We have clearly shown in this book that our brain can be shaped and educated according to our needs. The brain is plastic and capable of even new formations. If some nervous connections are broken in the whole chain, it is possible to replace them, by new links even. It is the mind stuff that makes the man; but we must persist in our work, if we want to succeed. We do not want to accomplish what is impossible. Our attempt is to achieve what others are accomplishing around us in our daily life. With a trained and educated "Will", we can change bad habits into good ones, bad tendencies into moral forces, weakness into strength, disease into health, and defeat into victory. The will leads the man, and remember, and always remember, that the Human Will is the Supreme Commander in the Battle of Life.

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## SECTION 13.

### HOW TO PRACTISE OUR SYSTEM.

Keep a mirror of at least 20 by 20 inches in size before you on a table or adjusted in the wall. Let the light from the windows or doors, fall upon your face and body and never on the mirror. Be careful about this.

Keep a regular record of the number of times you do each exercise. Increase this number gradually. Do not enter into any competition with your friends,

and increase this number by fits and starts. Be regular and be methodical. Commence first with five times, and go up to 15 within one month.

In the second month raise it up to 20, but do not exceed that number. If at the end of the second month, you feel fit and energetic, continue the same number for one month more. If on the other hand, you feel fatigued and unsatisfactory, lessen the number to 15 times or even 10. It is not necessary that you should do each and every exercise equal number of times. You may do some exercises more, and some less number of times. For example, in exercise A, for the legs, you may do the 1st and 2nd parts, namely, toes and heels, more and other parts very much less or you may even omit them. Exercises B, C and D, may be done equal number of times. Here also some do the 3rd part of B, namely, pressing the biceps, more number of times.

Exercise E is a special exercise for Brahmacharya. This may be done 15 times to begin with, and increased up to 50 in three months. Students who are weak, should confine themselves strictly to the number given in the book under each exercise until they get better, say for six months.

But those who are fairly strong must take up all the exercises very energetically, and keep on doing very regularly, and gradually increasing the number.

To those who want to develop great strength and endurance, we recommend the E and P Q exercises. E may be done 200 and P Q 100 times. But the whole number should not be done at one stretch. You can do them by turns in the following order :— A, E, B, E, C, E, D, E, PQ, X, E, F, PQ, X, E, L, PQ, E, X, O, PQ, E, X, YZ ; or you do all the exercises a fixed number of times as it suits you and select some special exercises and do them more number of times as your special course. So there will be a general course and there will be a special

course. For those whose digestive function is not satisfactory, we strongly advise exercises F, L and O. These do not come under the usual category of gradual increase. These are curative by nature and so should be done with great care a limited number of times only, if you want to preserve their curative value. An ordinary average student should not do these more than 15 times each. For beginners and weak students, we advise A, B, C, D, E, PQ, X, YZ, in the morning and F, L, O in the evening. The former 10 times each, and the latter 5 times each. Be careful not to do exercises after any food is taken. In the morning after calls of nature and before taking any food, you must do your exercises, and in the afternoon about four hours after morning meal. There are some who take exercises after taking some substantial tiffin. This is very dangerous.

In the morning after exercise is taken, an ideal student will massage his body and finish his bath in the sunlight. If you want to take any tiffin or lunch in the morning, you may do so ; but your next meal must be only after an interval of three or four hours. If you take your lunch at 7 a. m. then your next meal must not be before 11 a.m. as food requires some definite time to get digested, before it is assimilated.

If pure health is your consideration, then we do not advise any food to our students in the morning, as they are generally compelled to have their meal at about 9-30 or 10 a.m., on account of the school or college hours. They may arrange to have two *main meals*, one in the morning between 9 and 10 a.m., and the other in the evening between 7-30 and 8-30 p.m. These two meals, of course, ought to be made substantial, nutritious and tasteful, but free from spices and irritative massala (chillies, etc).

To make our advice practical, we ask our students to use uncooked nuts and pulses such as almonds (Badam), (2) groundnuts (Cheena Badam,

**Moongphali, Chanigakayalu, Kadaleykayi**) (3) Cocanut, green or dried, (4) Horse gram (**Boote, Chola, Chenna, Chanigalu, Kadaley**) (5) green gram (**Moongdal, Pesalu, Pachey Pyre**), (6) Peas (dried or green) etc. as their tiffin.

The last three kinds of pulses must be cleaned well and soaked in water on the first day. The second day, the water must be removed and with a slight moisture the gram in question allowed to germinate. They are fit to be eaten when they begin to sprout forth on the third day.

## SECTION 14.

### Exercises.

## COMPULSORY AND OPTIONAL.

Our system of culture has got both Compulsory and Optional Exercises.

**Compulsory Exercises** are those which every person ought to do as his minimum effort for securing Health and Strength. These are very scientifically arranged and secure the maximum benefit at a minimum effort. Those who are very weak may omit PQ, or Dands and do the rest, namely, A, B, C, D, E, F, L, O, S, X, Y, Z, to a moderate degree. Others of normal and average health are advised to do all the Compulsory Exercises.

**Optional Exercises** are those which are supplementary in their effect or are those which are useful for special persons for any special purpose, like Obesity, Football, Sprinting, Boxing, Wrestling, etc.; and for aged persons who want to cure or prevent diseases. The following are optional exercises. Exercises G, H, I, J, K, M, N, R, T, U, V, W, Massage, Walking, etc. These are dealt with, in the Second Volume of the Coming Man.

***Notice that each exercise should be studied under the following heads very minutely and carefully:—***

- 1. The main exercise itself.**
- 2. The five different parts of each exercise.**
- 3. The Physical Effect** in each movement which means what parts of the body and what special muscles are exercised and developed.
- 4. Special Application** which means the special use to which a particular exercise is put, to develop the brain and its faculties and what special features of character are developed by the exercise and what evil habits are erased and what virtues are established in their place.
- 5. Practical Use** which means how and under what circumstances, we derive actual benefit of the exercise in our every day work in life.

**N.B.—Special Application :—**

Since reference will be often made to certain Nerve Plexuses under the heading Special Application, we give a list of them here below. See Figs. 49, 55.

1. Sahasradala Padma or the Cerebral Plexus. No. 1.
2. Agneya or Medullary Plexus. No. 2.
3. Vishudha or Cervical Plexus. No. 3.
4. Anahuta or Cardiac Plexus. No. 4.
5. Manipoorak or Solar Plexus. No. 5.
6. Swadhishtan or Hypogastric (Lumber) Plexus No. 6.
7. Mooladhara or Sacral (Pelvic) Plexus. No. 7.

**N.B.—**These are the local centres which govern the surrounding regions concerned. When we advise you to think of any of these centres, what you have to do is to think and feel that actually some force charged with your thought is being put into action in the centre in question until by constant and frequent meditation, a permanent alteration in the nervous matter stimulated occurs by which the centre acquires special powers.

**The Five Aspects.**—See Pages 109 to 112.

If you want to develop the aspect of Physical Grace in you, do the exercises feeling that you are an aerial being of Beauty, Poise and Rhythm.

To develop a certain faculty you have to think of the unknown centre as existing in the Cerebral Plexus. Fig. 49 and Fig. 55 and meditate about the development of the faculty in question, as evolving or emanating out of that centre.

**6. Natural Elements or Pancha Thathwa.**—Our system may be treated under *Pancha Thathwa*.

1. The first is the zone of solids called Prithivi Thathwa. Its characteristic feature is solidity, and develop in you, Solidarity and Massive Strength.

2. The second is the zone of Liquids called Jala Thathwa. Its characteristic features are adaptability and adjustment. B, F, L and O.

3. The third is the zone of Fire or Agni Thathwa.

4. The fourth is the zone of Air or Vayu Thathwa.

5. The fifth is Ether or Akasha Thathwa.

## COMPULSORY EXERCISES.

In the First Volume of the Coming Man, we deal exclusively with the Compulsory Exercises.

The compulsory portion is treated under (1) Constructive, (2) Curative and (3) Educative headings. The educative aspect of the Exercises, is embodied under the headings, I, **Special Application**, II, **Physical Effect**, III, **Practical Use**, and IV **Pancha Thathwa**.

Exercises A, B, C, D, Combination of C and D and A, B, C, D, and, Exercises E, PQ, X, and YZ, belong to the Constructive Section. F. L. O., etc. belong to the Curative Section; so you must think and judge for yourself the number of times you do each exercise, as the Curative Exercises should not be done beyond a certain limit so that you can preserve their curative value.

### Exercise A.

The human body rests and moves from place to place on the legs. So we begin our system with the foundation of the body-structure. In dealing with the feet, we have to note down the five toes in front of, the heels behind and the soles under each foot. It is also a very important fact that the sole of our foot is a little arch of 7 tarsal and 5 Meta-tarsal bones, devised to be strong and to prevent shocks to the body or the brain. Imagine what a heavy weight of our body rests on these tiny arches of our feet !

This exercise is for the legs and has five parts.

#### 1. Stand on Toes. Fig. 57.

*Explanation* :—Stand with your feet nearly, at right angles to each other, that is, touching at the heels and the big toes being turned out, Fig. 56. Rise on your toes, lifting the heels from the ground, without touching each other. When you resume your original position, the heels touch the ground and you keep your feet almost at right angles, in a comfortable condition.

#### 2. Rest on Heels. Fig. 58.

*Explanation* :—From No. 1, come to No. 2 position, by raising all the toes away from the ground and resting only on the heels. Stand on the threshold of your room with your forefeet resting on it, and repeat (1) and (2) for rapid development.

If not, you can place two bricks on the floor and resting your forefeet on the bricks, you can raise and lower the heels. The forefeet serve as the fulcrum when the heels are raised up and lowered.

Repeat 1 and 2 alternately—Toes and Heels.

#### 3. Work on edges. Fig. 59.

Stand with the soles of the feet opened out so as to rest on the outer edges of the feet, the toes not touching the ground ; rise slowly in such a way as to give a curved motion to your feet, as if you are describing circles with your feet, the outer edges of the feet forming the circumference of the circle.

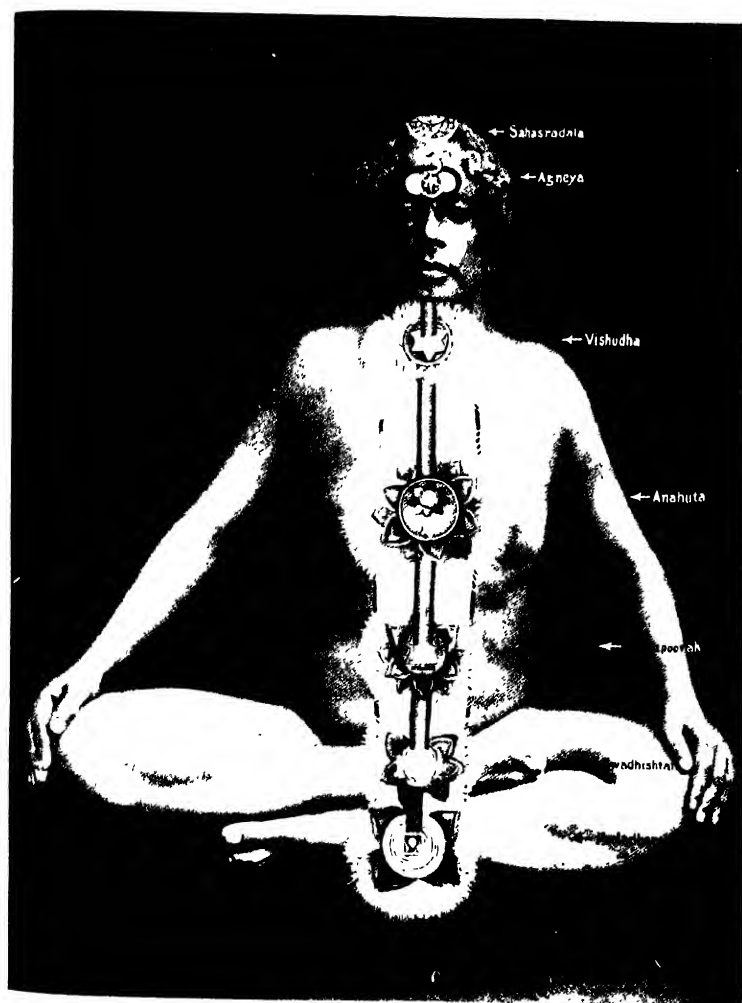


Fig. 55

See Pages 98 &amp; 141

Shatchakra.

Fig. 56

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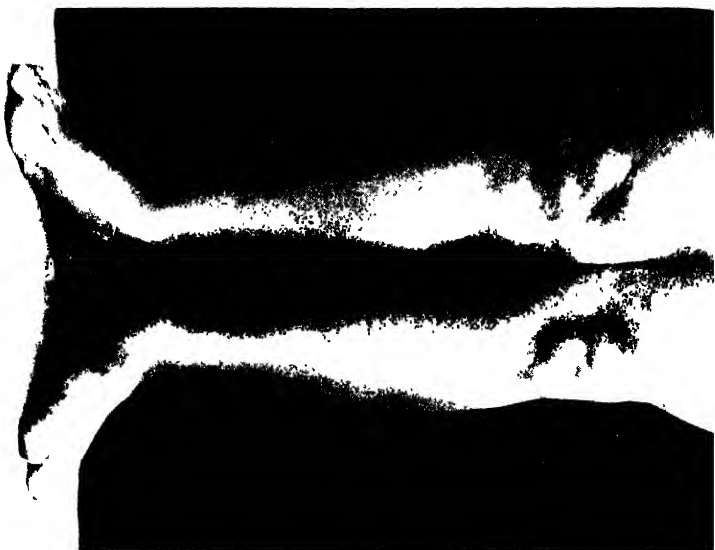


Fig. 57

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Fig. 59

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Fig. 58

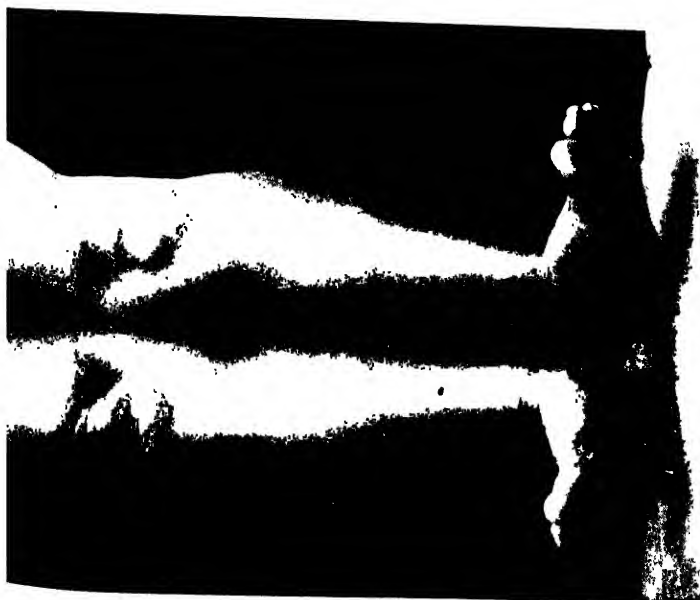
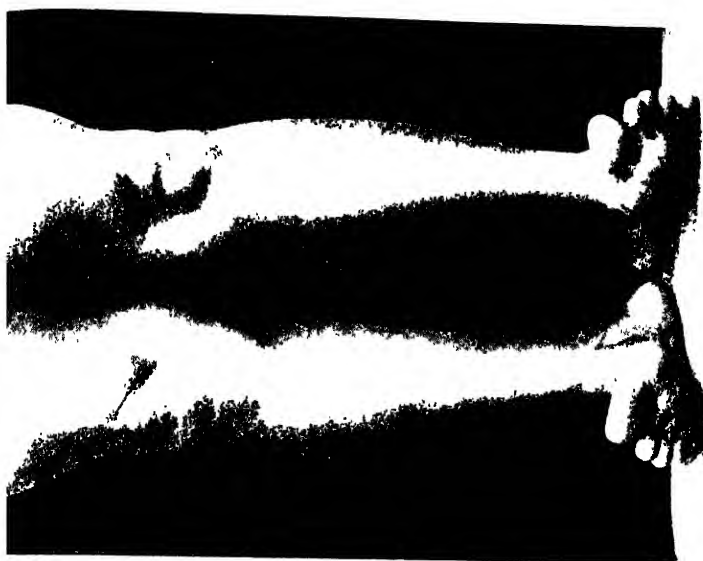


Fig. 60

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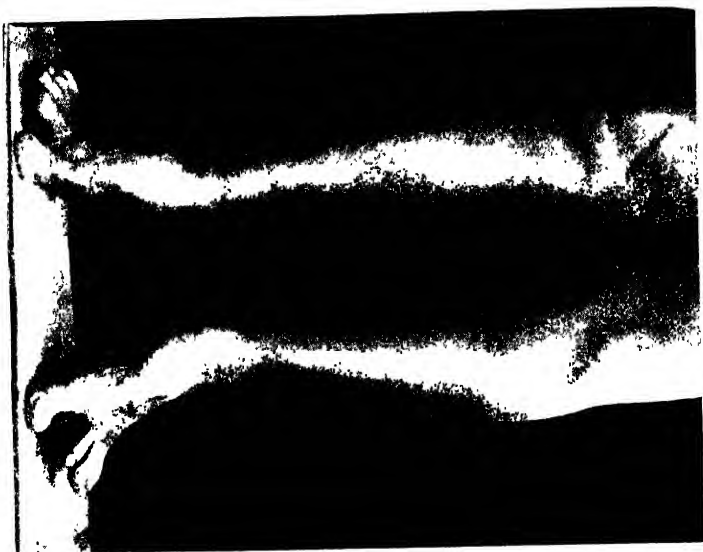


Fig. 61

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**4. Stand only on Big Toes.** Fig. 60.

*Explanation* :—Place only your big toes (one of each foot) on the ground and solely resting on these big toes, rise from the ground, raising your heels and your soles.

This is a very important and useful Sadhan for Brahmacharya and also for the curing of certain diseases such as Orchitis, Hydrocele, Epilepsy, Neuralgia, Neurasthenia, etc., for the prevention of which, people use metallic rings round the big toes, in the country side.

**5. Springing up and down, sit and rise slowly.**

*Explanation* :—This is akin to Bytaks in the Indian system. From standing position, go slowly springing or jolting up and down, until you sit down. But there is a great difference between the usual knee-bending exercises or bytaks and the one given by us. In the ordinary form that you come across amongst our Indian wrestlers, the movements, of sitting and rising, are done, in rapid succession, with a jerk given to the head, thus giving shocks (however imperceptible it may be), to the brain. At the same time, going down, from standing to sitting position, with a jerk, does not exercise all the thigh muscles. Whereas if you go on slowly, springing up and down, a particular muscle is stretched at every angle, thus exercising all the muscles of the thighs and legs at different stages and at different angles. Fig. 61.

When springing down you will feel pain and you are inclined to distort your face, and exactly then, is the moment, when, without allowing any such facial distortion, you should smile and keep smiling. When this habit of smiling is practised while doing your exercises, you will establish in you, a noble trait to bear all sufferings and hardships with calmness and equanimity of temperament.

**I. Physical Effect.**—Calf muscle or Gastrocnemius No. 17, Tendo Achilles No. 18, Soleus No. 19,

Tibialis Anticus No. 20 in Fig. 25, are exercised in the first four parts of A Exercise. In the fifth part the following are exercised. Rectus Femoris (No. 12), Vastus Externus and Internus (No. 13), Adductor Longus (No. 15), Sartorius (No. 16), in Fig. 25.

**II. Special Application.**—(a) Do all the five parts of A exercise in one continuous combination, as if all the parts form one exercise; and at the same time draw the abdominal wall in and contract the anus region, just when you rise to the standing position.

(b) When you rise up, put your mind in the Heart region (No. 4 Cardiac Plexus, Fig. 49.) and affirm strongly that you are strengthening your heart.

(c) Think and feel that you are educating and developing the lowest centre, namely, Mooladharam or Pelvic Plexus, No. 7 in Fig. 49, and Fig. 55, both when you sit or rise.

**III. Practical Use.**—This exercise prepares the legs for all outdoor work, sports, games, walking, standing, rising, sitting, climbing and running.

**IV. Pancha Thathwa.**—This belongs to the Prithwi Thathwa. Think that you are developing Solidity and Steadiness in you.

**From 5 to 20 times each part.**

### Exercise B.

The second exercise is for the hands. Once you begin the first part of B exercise, you should not relax the hands and bring them down, but go on through the other parts, doing each of them five times and then only relax and let the hands go down.

The B exercise is a test exercise. If a person is able to do each part five times, he is of normal strength. If he can do ten times, he is above the normal. If he does 15 times, he is good; If he does

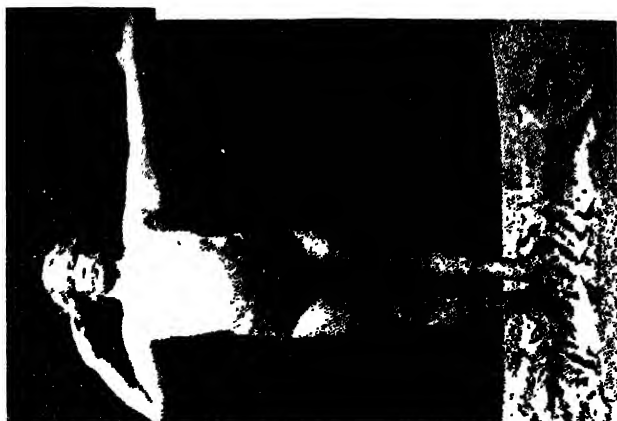


Fig. 64 Page 121

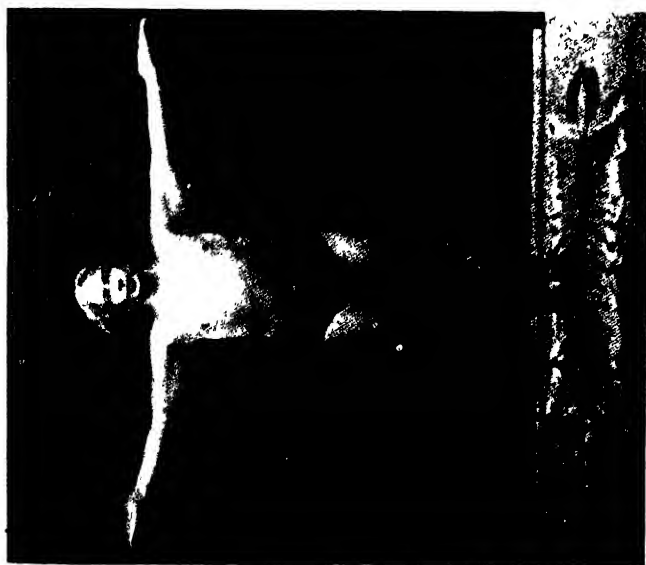


Fig. 62 Page 121



each part 20 times without relaxing the hand down, then he does all the five parts, one hundred times, and he may be called strong. Every student ought to aim at the standard of twenty.

### 1. Bend the Wrist.

*Explanation* :—Stand with your hands extended as in Fig. 62. (a) First bend the wrist of your right hand, with the fist closed. Take the bent fist, to your right shoulder. Then take the right hand back to its original extended position and open the fist and extend the palm. (b) Repeat the above with the left hand. Repeat (a) and (b) alternately. Fig. 63.

The Main Exercise here, is the Bending of the Wrist, and the other movements, namely, of taking the fist to the shoulders and back, are only secondary movements. You must thoroughly get hold of the Main Movements in each exercise and so, when you do our system, never unnecessarily strain your nerves or tense your facial muscles, but keep your face, cheerful and calm. The idea is to economise the expenditure of energy in doing an exercise, and thus get the maximum amount of development and efficiency, at a minimum expenditure of energy.

Repeat (a) and (b) five times and *without relaxing the extended hands*, go on to the next part of B Exercise.

### 2. Twist the Forearm. Fig. 64.

*Explanation* :—(a) Bend your right arm as in No. 1 but without bending the wrist, and then give a twisting movement to the muscles of your forearm with your fist closed, first to the front and then to the back. Extend the right arm. (b) Similarly bend the left arm and give one twist forwards, and one twist backwards, and extend the left arm.

No exertion should be made in bending the arm, but only in twisting it forwards and backwards. These movements are like those that we make when

we fan ourselves in the hot season. Repeat (a) and (b) alternately five times and *without relaxing your extended hands*, go on to the third part of B exercise.

### 3. Press the Biceps (Contract the Biceps). Fig. 65.

*Explanation* :—(a) Bend the right arm and when it is almost bent, then give a hard pressure to the Biceps and contract it. (b) Take the bent arm back, meanwhile bending the left arm and pressing the left biceps. Go on repeating (a) and (b) alternately, for five times. The alternate movements of the arms pressing the biceps must be done in such a way that when the right arm is being extended back, the left arm must simultaneously be going towards the left shoulder, as if the extension of the one hand and bending of the other, happen to be one common movement made *with elastic rubber bands or steel springs*.

The Biceps is a very neglected muscle. It is often an emaciated and flabby part of the Indian arm. It is one of those muscles which not only gives shape and beauty to the hand, but also adds, strength and vigour to it. It is useful to the sportsman, as well as to the artisan and painter. It adds to the efficiency of man-power and by neglecting this muscle, a man loses a good deal of the advantages which the human hand commands.

### 4. Screwing the Deltoid. Fig. 66.

*Explanation* :—Stand as in B (1). (a) Bend the right arm as in figure over the shoulder and from that position, bring the fist under the right arm-pit, keeping the upper arm in level with the shoulders and take it back to the shoulder. The movement is something like screwing the deltoid muscle, by moving the fist from the shoulder to the arm pit and back to the shoulder semi-circularly. Resume your position with your right hand as in B (1).

(b) Repeat a similar movement with your left hand. Repeat (a) and (b) alternately for five times.



Fig. 65

Fig 66  
Screwing the Deloid from position in Fig. 65, to Fig. 66 down the shoulders below the armpit.



## 5. Drawing the Trapezius. Fig. 67.

*Explanation* :—Stand as in B (1). (a) Fold the right arm and (i) take it to the left shoulder behind the head and over the back and (ii) draw it from that position to the right shoulder and (iii) again return back to the left shoulder, and lastly (iv) stretch the hand back to its original position. (b) Repeat similar movements with your left arm. Repeat (a) and (b) alternately for five times.

If you utter 1, 2, 3 and 4 respectively when you do these four movements, you will find it very easy to do them.

Stand with your arms fully extended on either side. The hands should be raised to the level of their respective shoulders. This is called the original position, which means the starting position of the exercise.

**I. Physical Effect.**—Wrist, Forearm, Biceps, Deltoids. Trapezius, are developed in this exercise. See Figs. 25, 26, 27, for muscles.

**II. Special Application.**—(1) While doing the exercise, think of exercising the Trachea, Larynx, Thyroid, etc., and the Nervous system in the Cervicle region No. 1 in Fig. 18, and No. 3 in Fig. 49.

(2) Since the Cervicle region (No. 3 Figs. 49, 55) lies within the influence of this exercise, you should meditate upon the Vishudha centre number 3, and think that you are developing within you Music, Voice Power and Eloquence.

**III. Practical Use.**—This exercise helps us in lifting, suspending, pushing, pulling, carrying, and drawing weighty things. It helps us in playing at Tennis, Badminton, Cricket, etc., in masonry and smithy work. The human hand is the most useful instrument which can be adapted to multifarious uses. Any exercise that improves and develops the hand, aids the corresponding and comparative

development of the brain as well. See Chapter on the Higher Psychological Value of Our System.

**IV. Pancha Thathwa.**—This belongs to the Zone of Jala Thathwa. It develops the spirit of Adjustment, Harmony and Oneness with Nature.

**From 5 to 20 times each part.**

### Exercise C.

(FOR CHEST AND BACK).

**1. Hands Back.** (a) Fig. 68. (b) Fig. 69.

*Explanation :—*(a) Stand with your hands fisted and kept together extended to the front, a little above the level of your shoulders. (b) From this position, take the arms downwards and backwards, each hand to its own side, expanding the chest to the fullest capacity. While you take the hands forwards and upwards, you rise on your toes and while you throw the hands downwards, to either side, you rest on the heels.

N.B.—For the sake of convenience and future reference, we call these movements of rising on toes and resting on heels as *Springing*.

**2. Swimming Back.** (a) Figs. 70, 71.

*Explanation :—*These are movements in exact imitation of swimming in water for going backwards, and consist in taking your arms alternately backwards and forwards. (a) Take the right arm backwards and from that position, contract the triceps of that arm by pressing it well against the serratus magnus and bend it, till your right fist reaches the chest. You must draw the hand from the back to the chest as if you are resisting some one from the back and this resistance is made by contracting the triceps muscle. (b) Repeat the same with the left arm. When you repeat (a) and (b) a number of times alternately, then you will get the correct position. In





Fig. 68 (1)

Fig. 12



Fig. 69

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a Fig. 21 Similarly with the left hand.





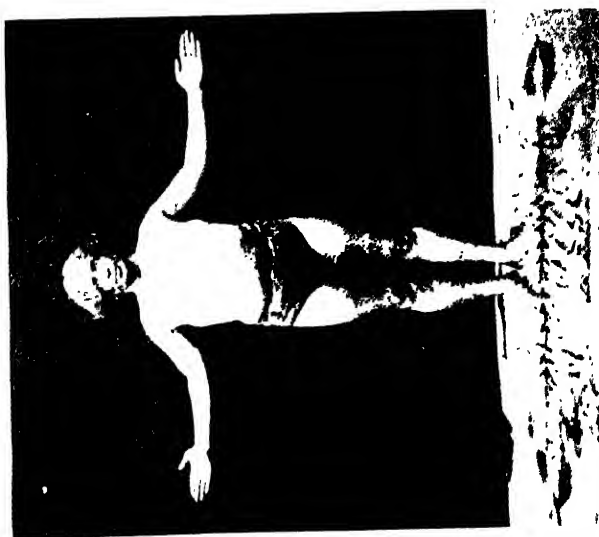
Fig. 72

Page 127



Fig. 73

Page 12



Page 126

Starting position for Fig. 79

Fig. 74

doing this exercise, the upper arms must be pressed well against the armpit muscles (*Serratus magnus*). While the right hand is being drawn towards the chest, the left hand is receding and going away from the chest, to the left side simultaneously, and *vice versa*.

The alternate movements of the hands going backwards and forwards, can be coupled with the springing movements of the feet, called, *springing*.

### 3. Hook the Palms Backwards. Figs. 72, 73.

*Explanation* :—Stand erect and take the hands backwards and hook the fingers of both the hands in such a way as to make the palms clasp each other very firmly. (a) Keeping the palms clasped, bend forwards keeping your knees straight and at the same time, bending the elbows and taking the clasped palms to the middle of the back. The higher you take the palms the better. At this stage, the hands are kept loose. (b) Then stand erect, taking the clasped palms down, fully stretched and the upper part of the arm, namely, the biceps, triceps, deltoids and the upper back fully contracted. This (b) part is the Main Movement. Repeat (a) and (b) alternately.

### 4. Lift the shoulders and Circle them. Fig. 74.

*Explanation* :—This is a very simple movement. It is something like the movements of the shafts of the engine-wheels. While circling the shoulders, you should not bend the elbows. The shoulders are to be lifted and moved circularly. The upper arm should press well against the muscles under the armpit (*Serratus magnus*).

### 5. Linking up. Figs. 75, 76.

*Explanation* :—(a) Stand erect. Link the finger of one hand with the corresponding finger of the other hand each time. Lift up the linked hands overhead, looking up, pressing the back of the head against the neck muscles (*Trapezius*). (b) Bring down the hands in that linked condition behind the head, over the neck, and simultaneously look downwards.

Then changing the respective fingers of the hands, repeat the up and down movements, with linked fingers each time. (a) When the hands are taken up, look up and press the shoulders against the neck. (b) When the hands are brought down, look down touching the chest with the chin.

Try this exercise as a variety, by holding a stick at a distance of 12 inches apart from one hand to the other, lift and bend your arms, up and down behind the back, and you will experience very good results for the neck, upper back and other muscles, such as the Trapezius, Rhomboideus, Serratus Magnus. Fig. 77.

The stick exercise is done for Rapid Development.

**Physical Effect :—**1. Pectoralis, Splenius, Sterno Cleido Mastoideus, Intercostals.

2. Triceps.

3. Deltoids, Biceps, Triceps, Brachialis Anticus, Supinator Longus.

4. Deltoids.

5. Finger and Neck Muscles.

The next exercise D, is almost just the opposite of the present one and all the five movements to be done can easily be guessed.

**From 5 to 20 Times, Each Part.**

### Exercise D.

(FOR BACK & CHEST.)

1. **Hands Forward.** (a) Fig. 78. (b) Fig. 79.

*Explanation :—*This is meant for spreading the back. (a) Stand erect. Stretch the hands sidewise. (b) Bring them to the front, crossing at the chest, as if you are embracing someone vigorously. Repeat (a) and (b).

2. **Swimming Forward.** (a) Fig. 80. (b) Fig. 81.

**Physical Effect :—**The Trapezius, Rhomboideus and Latissimus Dorsi are exercised.

*Explanation :—*(i) (a) Stand as in figure, with your left hand at the waist and your right hand raised, a little slantingly to the right. (b) Then take a

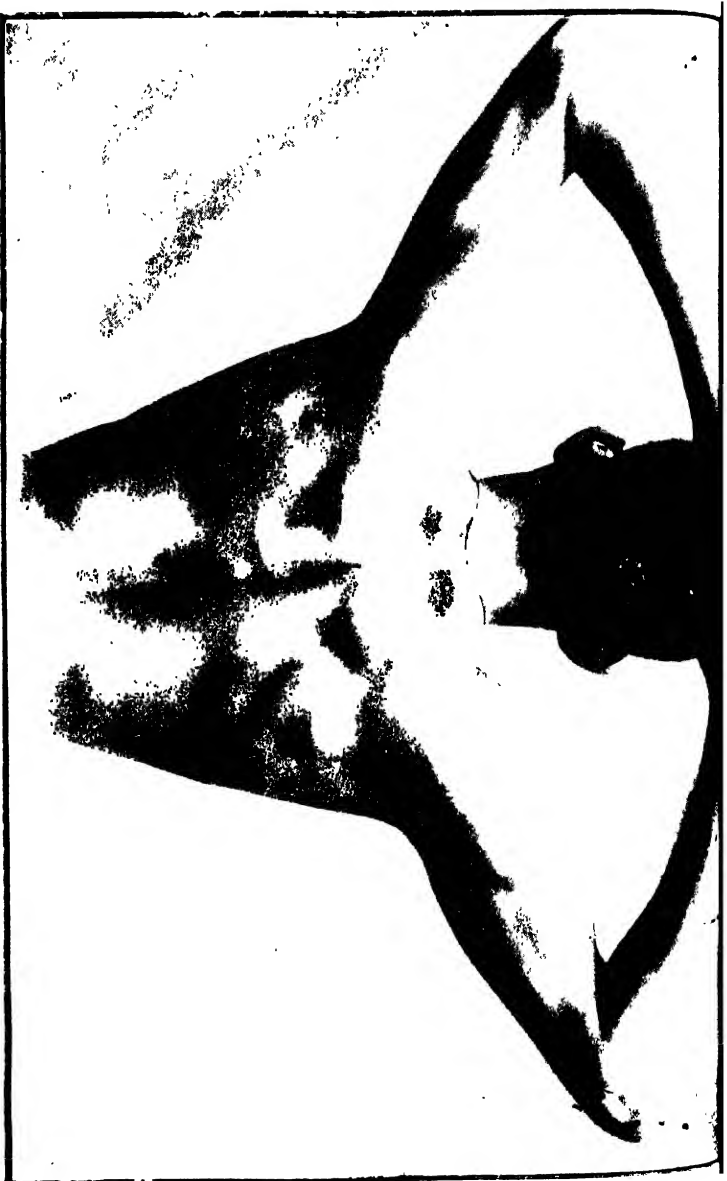


Fig. 75

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The author's son, Amarasimham

For Fig. 77 Instead of hooking fingers hold a stick and move the hands up &amp; down



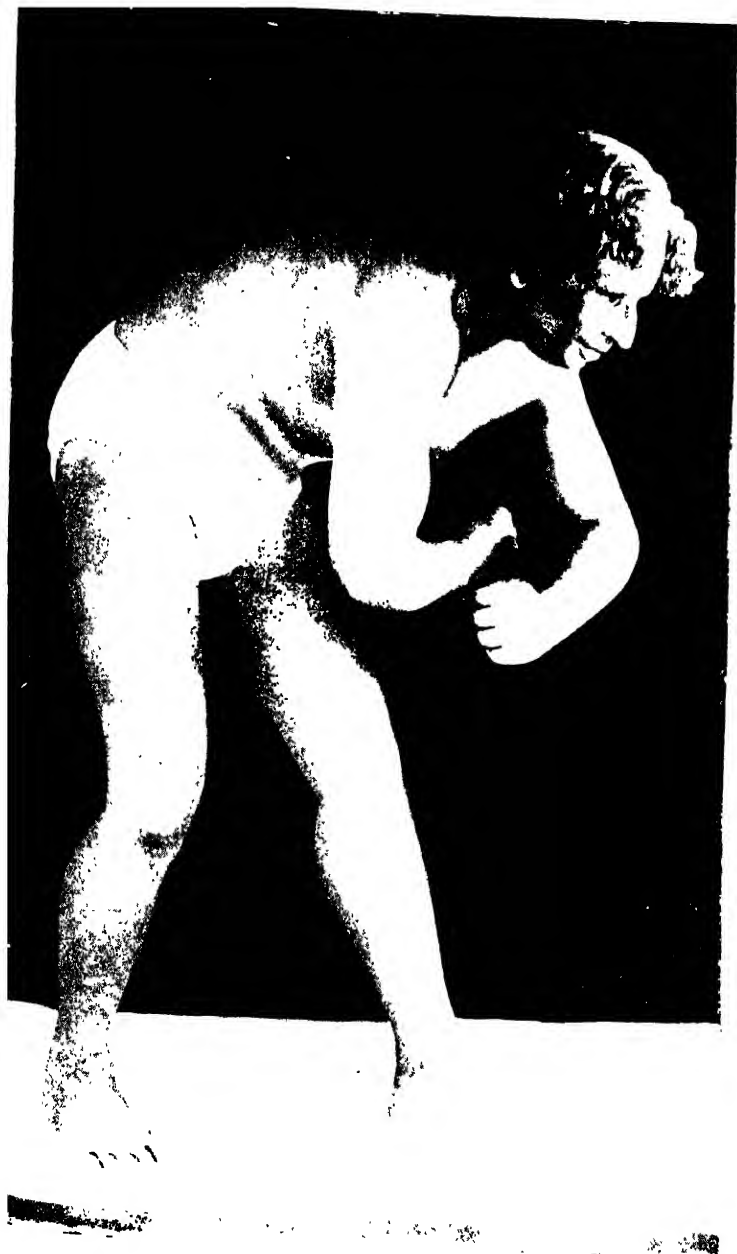




Fig. 80 a

Pages 126-127

sweeping movement with the right hand to the left side describing a circle. (c) Bring it back to the waist on the right side. (ii) Repeat corresponding movements with the left hand, namely, (a) keep right hand at the waist and left hand raised. (b) Take a sweeping movement with the left hand to the right. (c) Bring it back to the waist. Repeat (i) and (ii) alternately. These movements ought not to be done fast. They are slow movements of taking the right hand, bent like a bow, to the left and the left hand to the right, alternately. The movements of the hand must be one of a sweeping nature and after each movement is made, the hand must return and rest at their respective sides, position (c).

2. (b) For children there can be a variation of the exercise after they are able to do the above 2 Exercise. It is done as follows:—

When you take the right hand to the left, take a gentle hop of both the legs, that is, before the right hand returns to its own side, you should hop on your legs once and finish it. Then take your left hand to the right and at the same time hop gently once on both your legs and return to your original position.

2 (c) There is yet another variation which is still more interesting. It is as follows. In this exercise, there are three hoppings at three different stages.

I. The first hop is done when the right hand goes to the left and returns to its side.

II. The second hop is done in the middle stage after the right hand has resumed its position and before the left hand is moved to the right, that is, this hop is only an intermediary one, added to take time before commencing with the other hand. During this hopping the hands are in their respective sides.

III. The third \* hop is done when the left hand is taken to the right side and returns to its side.

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\* N.B.—These three hops must be made at equal intervals, successively, keeping to the accompaniment of numbering, One, Two, Three—1, 2, 3.

### 3. (i) Hooking the Palms Forward.

*Explanation :—*This is a vigorous exercise for the muscles under the armpits, the Serratus Magnus, chiefly, and also the chest muscles and certain back muscles. The movement is just like cutting wood with a saw.

Stand Easy. (a) Clasp the fingers of both the hands with their palms facing each other. Keep the clasped palms at chest-level and the hands in a loose and relaxed condition, before starting the sawing motion. Fig. 83, a.

(b) Take the clasped palms down the navel region, with the upper arm (the Biceps and the Triceps), pressing hand against the arm-pit muscles, namely, the Serratus Magnus. When the sawing movement is made, the hands go down as if you are cutting wood, with a saw. The hands must be fully and strongly contracted when they go down, and fully relaxed when you raise them up. Fig. 83, b.

3 (ii) After you have mastered these up and down movements, you can practise a combination of the leg and hand movements, in the following way.

Stand with the right leg forward. Repeat (a) and (b) alternately and at the same time changing the legs with a hop ; that is, if the right leg is taken backwards, the left leg should be put forwards, with a hopping or lunging movement. For example, Number (1) movement consists in taking the hands downwards keeping the right leg forward ; No. (2) movement consists in relaxing and taking the hands up, and at the same time taking the right leg backwards and putting the left leg forwards. When you change the position of your legs, you must take a jump from one position to the other.

**Physical Effect :—**This is a vigorous and manly exercise, for the chest and legs. It improves the capacity of the lungs. Serratus magnus is exercised.

Fig. 80b, 81 & 82

Pages 126 & 127



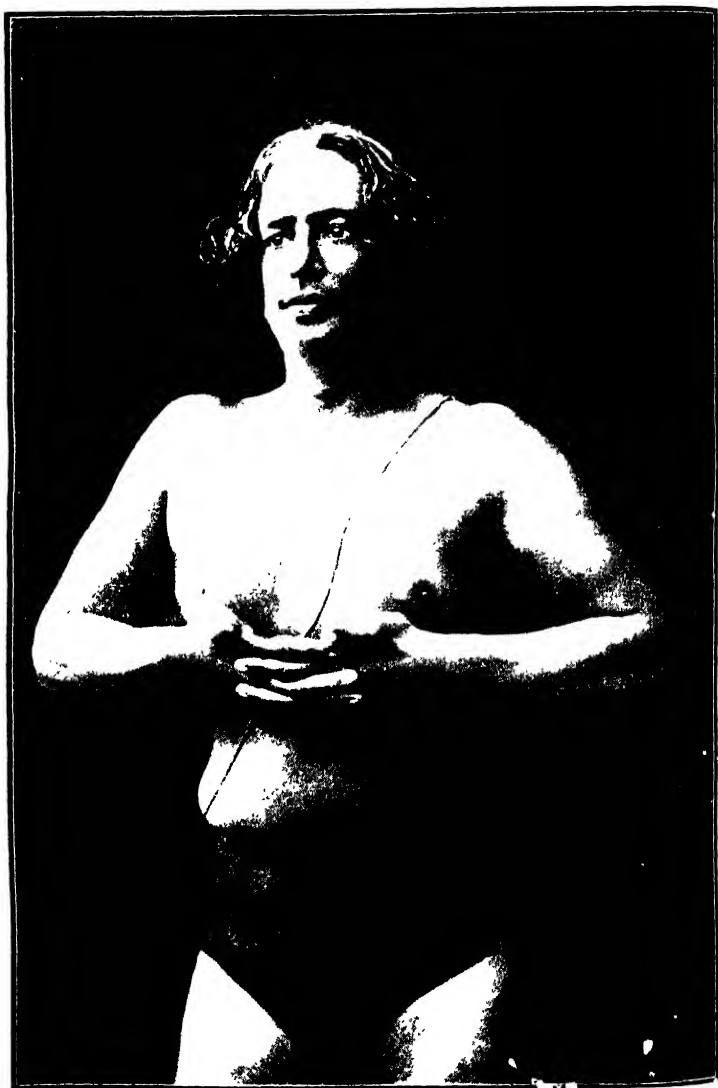


fig. 83/a

#### 4. Lifting Water. Fig. 84.

*Explanation* :—Stand erect. (a) Bend trunk and head down, *without bending the knees* and take the right hand down and raise it up, as if you are drawing water from a well. Raise your trunk along with the right hand. (b) Lower the left hand and trunk, and lift it, raising the hand and trunk up.

These movements are made in imitation of drawing water from a well. The movements of the hands are made alternately. Each hand must go down at least up to the knee and even below it and drawn up without any stiffness in the hands. The most important point is *the keeping of the abdominal wall drawn in and pressed back and the breath held up naturally*, while the lifting and drawing movements are going on alternately. The knees should not be bent. The body should bend at the waist, every time when the hand goes down, and raised up to erect position, whenever the hands are drawn up. The hands are kept in a loose condition, but the abdominal muscles are kept firmly contracted by drawing the abdomen in.

**Physical Effect.**—This is a very good exercise for the abdominal muscles and organs in the abdomen, such as the liver, spleen, intestines, kidneys, etc.

#### 5. Linking Fingers Forwards. Fig. 85.

*Explanation* :—Link the finger of one hand with that of the other. Take them forward fully and bring them back. Change the fingers each time.

This is similar to the 5th part of C Exercise ; only, instead of moving the hands overhead, up and down, you take the hands to your front as far as you can stretch them and bring them back to your chest. At this stage, that is, when the hands are at the chest, you should pull the fingers to the opposite directions as in tug-of-war.

**I. Physical Effect.**—It is an exercise for fingers as well as muscles of the neck, back and mainly, for the

muscles round the collar bone, that thin, and frail bone which breaks during any accident in horse riding or in the game at foot-ball.

These four exercises namely, A, B, C, D, each having five parts of their own, are quite sufficient for developing the muscular portion of the human body. They are arranged in such a way that each exercise develops a certain recognised and marked area and at the same time, has the effect of relieving the muscles previously exercised. Thus A exercises the area of the legs including the thighs, calves, ankles and toes. Then the legs are given a little rest and the hands are being exercised in B. After the muscles of the hand are taxed through B exercise, the movements in the succeeding exercise C, give relief and rest to the hand, but exercise the muscles of the chest. Exercise D, serves the purpose of relieving certain muscles exercised in C and in its turn, work upon certain other muscles of the back. Therefore you will notice, that the arrangement of the first four exercises is based upon the scientific principles of division of labour, isolation and contraction of certain muscles and relaxation and rest of the other ones.

We wish to emphasise once more the fact that we have introduced such exercises and arranged them in such a way that by a peculiar adjustment of a scientific system, contraction of muscles are balanced by their relaxation and rest, thus creating harmony and staying power in the system and warding off fatigue and disease.

**II. Special Application.**—(C and D). Think of developing the Anahutha or Cardiac Plexus, (No. 4, Fig: 49 and page 117), to strengthen the heart and expand the lungs. Also Fig. 55.

**I & III Physical Effect & Use.**—C. and D. develop the strength of the arms as well as the trunk in their combined function. Physical improvement in this direction helps Art, Agriculture and Industrial development.





Fig. 85 Page 129

Endure Forwards.



Fig. 86 Pages 131-132

from Fig. 86 (No. i) to Fig. 87 (No. ii) by throwing the arms up, then bend the arms at the sides and bring them forwards as in Fig. 88 (No. iii) and press the arms at the arm-pits (Serratus Magnus) and cross them as in Fig. 89 (No. iv).



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When the hands go from 86 to 87 position, you should lunge and change the position of the legs by taking the right leg back and putting the left forward.



Fig. 88

Page 131-132

**IV. Pancha Thathwa.**—C and D Exercises represent both the Agni (Fire) and Vayu (Air) elements. As such they are the connecting link between the two kinds of Zones. These exercises develop within you massive strength combined with Liquid Energy, Vitality and Lung-Power.

### COMBINATION EXERCISES.

These four exercises can also be combined into one exercise, for exercising legs, hands, back, and chest. Variety is the very spice of life. To take away the dulness of monotonous movements, we have brought in, a good deal of combinations, in our exercises, which depend upon the genius of the individual concerned. No exercise should be continued for a long period. Begin A, B, C, D with five movements of each part in each exercise and after one round of 5 movements of each of these, then if you want more exercise, you may have one more course of 5 movements of A, B, C, D, again.

The combination of C and D exercises must be done by every student. This is a special exercise for the rapid development of the chest. You will have an increase of 2 to 3 inches in the chest, through this exercise within a brief period of three weeks.

### COMBINATION FOR SPECIAL CHEST DEVELOPMENT.

C. and D.

#### Hands Back and Hands Forward.

(i) Stand as in figure with your right leg forwards in the position of attack. (ii) Then repeat the movement of Hands back. (iii) After the hands are taken back, bend the arms as in figure and (iv) bring them forwards pressing and rubbing them against the armpits and assume No. (i) swelling out the chest muscles. (v) And again, when you throw the hands back, you should simultaneously change the position

of the legs, namely, the right leg will be taken back and the left leg will be placed forwards.

So the exercise has two parts ; No. (1), Hands forwards and Hands backwards, and at the same time, accompanied by No. (2), lunging movements of legs, from front to back and back to front. You must know the exact time, when the legs are changed. It is when the hands go back, No. (ii) you change the legs, by a gentle lunging or jumping. (i) Fig. 86. (ii) Fig. 87. (iii) Figs. 88 and 89.

**I. Physical Effect.**—We very strongly advise this exercise to our young men over 15 or 16 years who want to develop their chest muscles. This is a manly and vigorous exercise to induce active movements and power of endurance. It has a wonderful power of improving the lungs and their development.

**II. Special Application.**—Think that an impulse is sent from the Anahutha Chakra (4th Centre) to the Sahasradalapadma, the 1st Centre. The Central thought of this impulse should be Physical Courage.

### COMBINED FORM OF A, B, C, D.

The above four exercises are, when regularly done in their combined form, quite sufficient for the development of the muscles in all the parts of the human body. It has already been stated that there are 527 muscles. Many of these muscles must be not only individually exercised but also in groups. Many physical culturists generally commit a great blunder in exercising the muscles without a clear and definite ideal. Many think of developing the muscles for the sake of mere beauty and largeness. This may suit well in the case of some individuals, but not as regards a race or nation. Our main purpose is to combine utility with efficiency. After attaining this we may think of huge muscles, etc., in the case of certain special persons. So in training the individual man, our chief object is to develop in him, usefulness as a citizen and endurance and hardihood as a man.

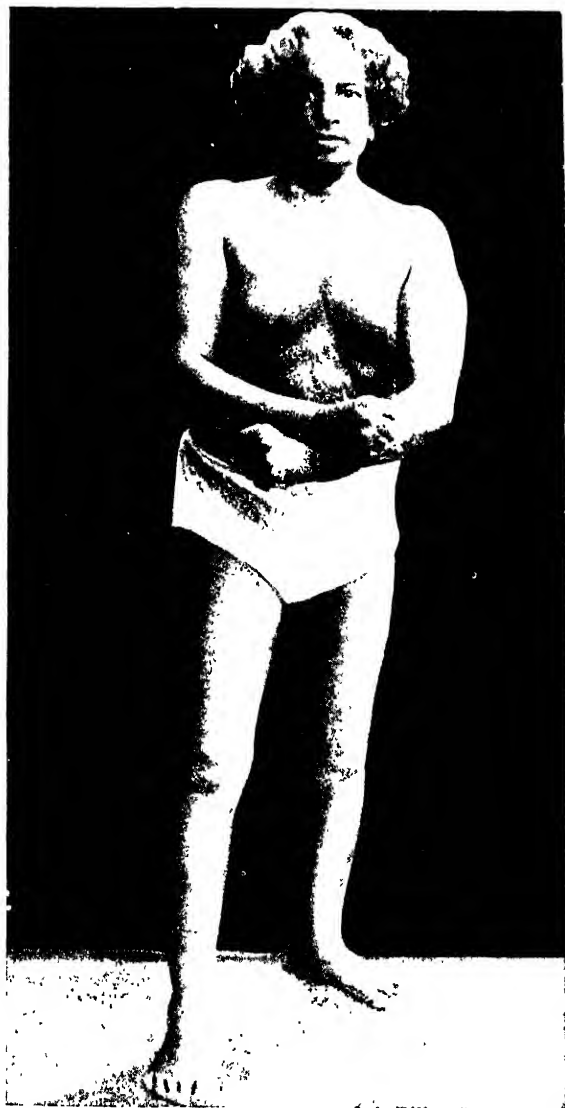


Fig. 89



Fig. 90

Pages 133-134



Fig. 91 Pages 133-134

[From position No. 90 go to position of Fig. 91]

There is a very great difference between a race horse and a cart horse. Our ideal is a mean between the two, for the generality of mankind.

**To resume our subject :—**The exercises A, B, C, D, can be done in their analysed forms as detailed before, and they can be done in a combined form as well. First analysis and then synthesis. The combined form will give exercise to the larger areas of muscles.

A. B. C. D, combined is done as follows :—

1. Sit balancing on the toes, the heels not touching the ground and the hands kept hanging on either side. A(1). Fig. 90.
2. Rise, taking your hands up and folding them on, as to touch the shoulders, with your respective fists. B(1). Fig. 91.
3. Then take the arms backwards, expanding the chest fully, and pressing the hands firmly at the arm pits. C(1). Fig. 92.
4. Lastly, bring the arms forward, pressing the arms at the arm-pits. D(1). Fig. 93.
5. Then bring your hands to your sides and stand erect. Starting Position.

The above movements should be done, at regular time intervals, that is, in a rhythmic way.

When demonstrating the combined form of A, B, C, D, we recite the following lines from Grey's *Elegy* to show the rhythmic movements expected to be gone through. You may try the same rhythm as follows when you do the exercise.

1	2	3	4	5
Full mány a gém of púrest ráy seréne,				
The dárk unfáthomed cáves of ócean béar,				
Full mány a flówer is bórn to blúsh unséen,				
And wáste its swéetness ín the désert áir.				

That is, you must repeat the above verses, rhythmically and slowly, and as you go on repeating them you must also go on doing the different parts of the exercise, beginning with No. (1) sitting, (2), standing, (3) taking the hands back, and No. (4)

bringing the hands forward, and lastly (5) assuming the original starting position. The numbers 1, 2, 3, 4, 5, must correspond with the movements as follows:

From starting position assume.

1. Sitting position—A. Fig. 90.
2. Rise with hands folded.—B. Fig. 91.
3. Take the hands backwards.—C. Fig. 92.
4. Bring the hands forwards.—D. Fig. 93.
5. Stand, bringing the arms to sides.

At the first stage, mere mechanical movements as mentioned above are to be done. After you are sufficiently advanced and you are familiar with all the parts of A, B, C, D, then, you can change the movements according to your own inclination, that is, you can combine any part of A exercise, with any part of B, and any part of C, and any part of D exercise.

Each exercise consists of five parts, hence all the four exercises contain 20 parts. So this combination of A, B, C and D, is a made-easy form of these 20 parts, as one exercise. Either for want of time or for the sake of variety, students may do this combination to exercise the muscles of the legs, hands and trunk. You can do 12 movements of this combination per minute. If you do it for three to five minutes, you will be very nicely exercised all over the body.

Remember that exercising any *one* part of the body more, is a tyranny to the body system. But to exercise the *whole* body with variety and co-ordination of movements, is a great benefit to the system, and creates hardihood and endurance in it. This co-ordination of movements does not develop the body at the expense of the brain. It aims at symmetry, activity, balance, and action of the limbs and trunk. It brings intelligence to the dull boy and activity to the lazy. This is the specialty of our Psycho-Physical Culture. This higher aspect of our exercises, is explained in a special chapter on the Psychological Value of Mohun's Psycho-Physical Culture.

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**Exercise E.****(FOR BRAHMACHARYA).**

The last mentioned four exercises are both constructive and educative in their effect. These are quite sufficient for purely bodily development. The next exercise that follows after these is a special one and has a special bearing in our system. It is a unique exercise with a unique purpose. Thousands of young men have reaped the benefit of this exercise. In fact almost every young man in our country between the 15th and 25th years, suffers from nervous weakness and want of Brahmacharya. There are many systems of physical culture and all these deal with the muscles and general health. The one great want amongst the youth is not met in any system in Europe or America. All are silent about it. They advise young men to take exercises generally and improve the condition of the body and then only indirectly to preserve and maintain Brahmacharya, which consists in making the fullest use of the life-energy developed in the human system. Its wastage is the source of misery amongst mankind. Nervous breakdown is a very common disease amongst the younger generation of our age. Modern civilization has made their condition worse still. Novels, Bioscopes, Theatres, Restaurants, Obscene Pictures, Motor Buses and Tram Cars, Crowded Cities and Smoky Skies all these have a great influence on the health of young men.

We always felt the need of an exercise for developing and making full use of the *life-energy* in man, and after many experiments and long and continued trials, we have devised an exercise based upon the soundest principles of the ancient Yogic methods and the modern science of physiology. This is the fifth exercise, known as the Brahmacharya exercise in our system. It has given relief to and saved thousands and thousands of young men. But the

most unfortunate thing with our young men is that they always take to a Sadhana or practice with doubt, diffidence and despair; only a few of them after some months of indifferent practice, when they find some improvement, have the patience to take to it with greater zeal. What we advise is that no body should expect a miraculous and sudden cure of the wasting disease of the loss of Life Energy, but aim at first to the general improvement of the physical parts and in due course of time, to get relief from that fiendish disease of losing the essence of life.

## E. BRAHMACHARYA EXERCISE.

### 1. The Main Brahmacharya Exercise.

(a) Stand easy.

**First Stage—(b) Sit.** Fig. 94.

Sit balancing on toes, heels not touching the ground, head erect, chest raised and kept forward and chin inwards.

**Second Stage.—(c) Rise up.** Figs. 95, 96.

Stand resting on the toes, heels not touching the ground, bending the head forward, looking down towards the navel, without bending the knees. After rising, instantaneously draw the navel in and give a pressure to the abdominal walls as far back as possible, when naturally you stop the breath as well.

**Third Stage.—(d) Resume Position (a).**

*Note* :—The heels do not touch the ground in the first and second stages.

This exercise is something like lifting a weight placed before you on the ground. What do you do when you lift a trunk with some weight in it? You bend forwards and downwards, hold the trunk on either side and when you lift it, your abdominal muscles are drawn in and well contracted and your breath also is automatically stopped. All these things are to be imitated in doing the Brahmacharya exercise without any weight being actually lifted.



Fig. 92      Pages 133-134

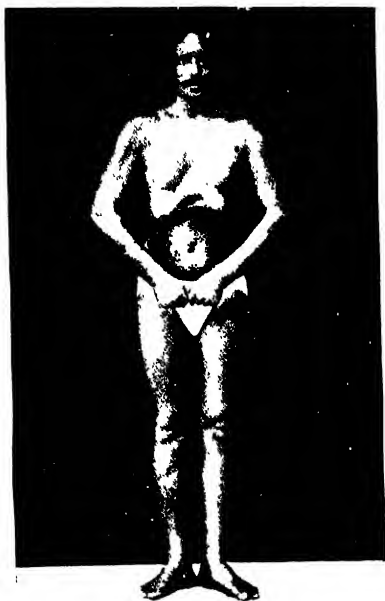


Fig. 93      Pages 133-134



Fig. 95      Pages 136-137



Fig. 83 (b)      Page 128

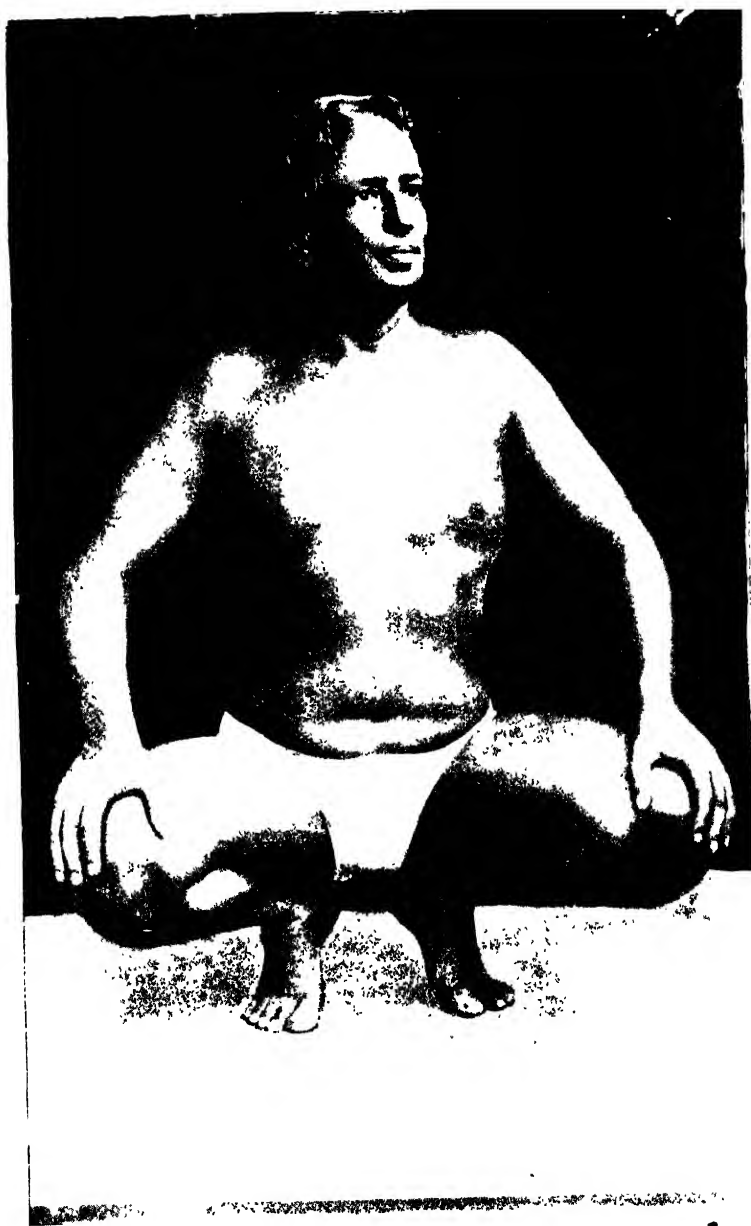


Fig. 94.

Pages 136-137



Fig. 96

Pages 136—137

From position 94 go to 95 and then to position of Fig. 96

For Jalandhara Bandha: No. 97 see figures 92, 93 and 96 where the abdominal wall is drawn inwards.



Page 143

Fig. 99(b)

The Yogic Paschimathana Asana.  
Ashtanga Samhita, Chapter 3, Part 1, Chapter 3, Part 1, Chapter 3, Part 1.

A good deal has to be written about this exercise. Our own system of Psycho-Physical culture will become more and more popular as time advances through the practice of this important and central pivot upon which our whole system of Psycho-Physical Culture is based.

### NATURE OF BRAHMACHARYA EXERCISE.

It is an exercise for all round development. It does not exhaust or overwork any particular part. The human body, while doing this exercise, looks like an arch, one end of which is represented by the toes and the other by the head looking towards the Navel. The middle of the arch is represented by the *Navel* which may rightly be called the **Key-stone** of the arch. The main exertion of the exercise is directed towards the *Navel*, which is contracted, drawn in and pressed backwards.

### THE ORIGIN OF THE EXERCISE.

The main principle of the exercise is drawing the navel in and pressing it backwards and contracting it very powerfully, with the natural result of holding the breath as well. This main principle has been taken from the ancient science of Yoga which is the result of physical exercises combined with breathing and mental practices. In the physical portion there are certain Asans or bodily postures to be mastered. In connection with this, there are three important Asans which are highly desirable to be learnt by a Brahmachary, namely :—1 Padmasan, 2 Sidhasan, and 3 Paschamuthanasan. In all these three asans you will find the same principle of controlling the navel region and the plexuses called Mooladhara, Swadhishtana, and Manipoorak. Brahmacharya, therefore, is purely a "Navel" warfare depending upon the control of the Navel-base through Navel-conquest.

The main principles of the three Asans mentioned above are incorporated in the Brahmacharya exercise. These principles, when analysed, are as follows :—

1. **Moolabandhan**—or the contraction of the sphinctre at the anus which process is also called the Aswini Mudra in Yoga.
2. **Voodyana Bandhan**—or the drawing of the navel in and pressing it back. Fig. 96.
3. **Jalandhara Bandhan**—or the closing of the throat region by pressing the chin against the chest. Fig. 97.

A good deal of preparation ought to be gone through before practising the Asans. You should give proper attention to your diet, keep before you the purpose for which you practise it and preserve a beautiful mental attitude during your practice.

#### APPLICATION of BRAHMACHARYA EXERCISE

The application of an exercise is quite different from the exercise itself. A potter may be turning his wheel round and round. It is of no use unless there is the clay ready and an attempt is made to convert the mass of clay into beautiful pottery. It requires mental conception, adequate practice and dexterity of and control over the fingers. If you stand by a potter and watch him when he is at work, it is a sight, sometimes, for the angels to witness. The wheel is mechanically moving, but the clay manipulated by the dexterity of the potter assumes a beautiful shape as if brought into being with the magician's wand. It is a pity that the potter does not view his life with the grandeur and beauty of his profession. It has become a wearisome hum-drum routine for him which is the inevitable result of degrading any noble and beautiful art into the drudgery of a profession. Every youngman (Brahmachary) must mould his life like a potter and through patient and persistent effort, bring out the best out of him. We offer the Brahmacharya exercise for this great purpose.

As this volume will grow out of proportion and the digression will, comparatively, be a very long one, we have refrained from going into further details of this most interesting and none-the-less extremely useful subject. Therefore we refer our young friends to our book on Brahmacharya which is a treatise written for those millions of youngmen all over the world who are toiling to climb the rocky steeps that lead to Health, Happiness and Liberty.

This exercise, if done without the application we are refering to, will no doubt bring about an all round development of the legs, waist, back and the hands. But if the special application is coupled with the usual exercise, then it has some marvellous effect on the body and mind. This effect is more to be realised than spoken of. It corroborates the great physiological maxim that "Function creates structure." It also strongly reminds us of the Sanskrit saying,

*Yadrishee bhavana yasya sidhirbhavathi thadrishi.*

It means that whatever reasonable ideas we entertain, we do realise them sooner or later. Idea exists before organization. We should think and feel certain things intensely before we can realise them.

According to the ancient science of Yoga, we are capable of controlling, strengthening and educating the nerve cells just as it is possible to strengthen, control and train the muscles. We see an appreciable development in the muscles and so we believe in it. But we do not see what happens with the brain or nerves, so we are not inclined to believe in it. But it is a scientific fact that the nerve cells can be strengthened and modified as the muscle cells are being done by us.

**I. Physical Effect.**—This exercises the hip and thigh muscles, as well as, those of the abdomen.

**II. Special Application.**—The application of the Brahmacharya exercise consists in the following :—

When you rise from the sitting position (Fig. 94) to standing position (Fig. 95), send an impulse from the Mooladhara to the top of the head or Sahasradala Padma.

Sending an impulse means, sending a current of thought or message. In doing this you must actually feel that some force charged with your thought, is starting on its mission from one centre to another. It is no doubt purely imaginary in the beginning. Plexuses (Chakras) are groups of nerves controlling the function of some organs, glands, etc. Each plexus or chakra must be conceived as a battery which becomes well developed and charged with power through a special mode of development. The nucleus of a battery is there. But it must be first developed into a battery and then charged with the function of generating energy and transmitting that energy into the cells and fibres of the body. If there is any doubt about this, you have only to think how the brain works and thinks and solves great problems; and how the nervous system receives impulses from and sends its commands to the various parts of the body. We can take even a very common example, namely, the temporary control of urine.

An infant passes urine instinctively and is not aware of any control over it. As he grows older and older he learns that he should control it. When he becomes a boy he knows the place where to urinate and controls it until he reaches that place, but not so with an infant. There are some cases amongst grown up boys who invariably pass urine in their bed at nights, as they suffer from a special disease of this kind.

So what happens with man is that he learns to control many nerve centres as he advances from infancy to youth and manhood to old age. Compare the dexterity of the fingers of a man playing upon certain musical instruments, or those of a typist who

goes on typing without looking at the machine. It is simply marvellous.

To resume : Sending an impulse, therefore, means, feeling that one is establishing some relationship and sympathy between one centre and another. Just as we establish co-ordination between one muscle and another, so also we have to establish co-ordination between different plexuses. It is, therefore, better to simply think of the existence of the nervous plexus, for example, the Mooladhar. We have not seen the kidneys and yet we believe when the doctors say or when we read in a book of physiology that the kidneys perform a very important function of removing urea and uric acid from the human system. We believe in the existence of the thyroid gland and its peculiar functioning. We can therefore believe in the existence of certain nerve centres or a group of nerves (Chakras) controlling the functions of certain organs in the human system and for our present discussion, in the lower abdominal region. Call this group by any name you like. We have called it Mooladhar, in the nomenclature of Yoga or psychophysical culture. Again think of Swadishtan as the second centre, Manipoorak as the third, Anahuta as the 4th, Vishudha as the 5th, Agneya as the 6th centre. See Figs. 49, 55.

We can locate them roughly in the following regions :—

(a) Mooladharam, 7, just parallel to the generative region, the lowest centre in the spinal cord.

(b) Swadishtanam, 6, a little above Mooladhara and about six inches below the navel.

(c) Manipoorakam, 5, just behind the navel.

(d) Anahutam, 4, the heart region.

(e) Vishudham, 3, throat.

(f) Agneyam, 2, forehead.

These Chakras have to be conceived as existing both in the spinal cord and also in the sympathetic nervous system outside the spinal cord, in a static

condition awaiting the touch of the magical wand of sadhana or practice, to become Dynamic and Creative in their effect. In fact what is Static must be made Dynamic.—this is the true purpose of Yoga.

**III. Practical Use :—**The best result comes out of this practice. The Energy of life in man is found in every cell of the body. It is supplied directly through the blood and indirectly through the seminal glands which are situated in the lower abdominal region about six inches below the Navel and three inches above the root of the generative region—this region is controlled by plexuses Swadishtanam, No. 6 and Mooladharam, No. 7, in Figs. 49, 55.

The Seminal Essence which is the Energy of life, is carried from the lower regions to the Cerebral region, with the result that the brain is built by the brain substance in addition to the magnetic nutrition supplied by pure blood.

**IV. Pancha Thathwa.**—This belongs to Akasha Thathwa or Ether in nature. Its chief feature is Penetrability.

The following three asans are inextricably connected with the principles underlying the Brahmacharya Exercise. We strongly advise our students to practise them carefully.

### PASCHAMUTHANA ASAN.

This Asan is done as follows :—

(a) Lie down on the ground.

Keep your hands stretched behind the head.

(b) Rise up and come to sitting position without bending the knees and hold the big toes. Fig. 99.

When this figure is inverted, it looks as if one is standing on one's legs, bending forward lower down and holding the toes. The close imitation of this inverted figure without taking the hands so lower down as to touch the toes, but keeping the hands a little above the knees and pressing the navel back



Fig. 100

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The principle underlying the Paschimuthana Asana is employed while standing as in Fig. 100. It is also for Figure 97 Jalandhara Bandhan of drawing the abdomen inwards.

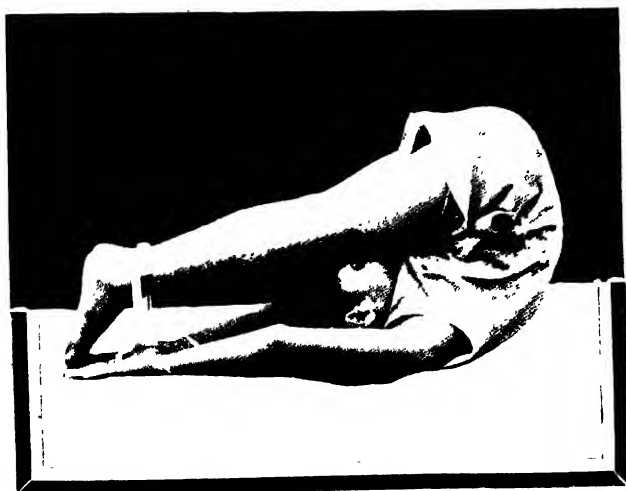
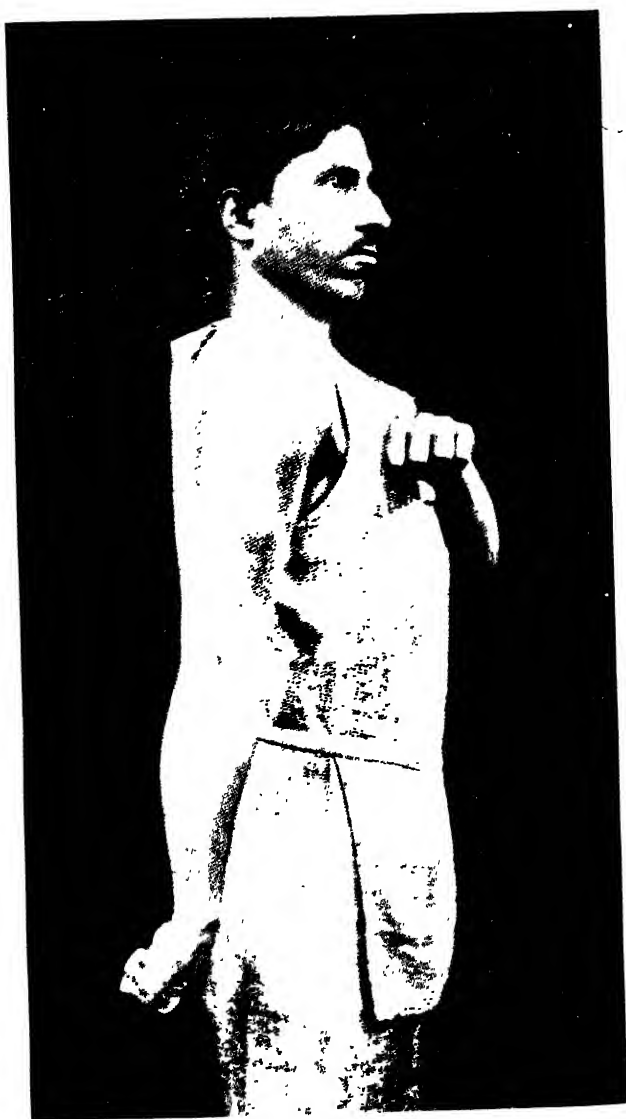


Fig. 101

Hemalatha Devi.

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Amarasingham,  
the author's eldest son

and holding the breath, is the nearest approach to and the essence of our Brahmacharya exercise.

We discovered this method and devised it in the year 1912, into a definite exercise after a serious study and practice of Yoga for full fifteen years after we came in touch with the great Swami Vivekananda in 1897. Eighteen years have elapsed since it was placed before the public in 1912 and the result has been exceedingly hopeful and inspiring.

It is very interesting to note that the principles underlying the Paschamuthana Asan can be observed in the following three different ways :—

1. In the standing position, when the feet are resting on the ground. (See figure 100 Standing.)
2. In the lying down position with the back resting on the ground and the hands and legs raised up and held aloft. (See figure 101 Lying Down.)
3. The Yogic Paschamuthana Asan is done while sitting on the ground, with the legs stretched on the ground, knees not bent and holding the big toes with the fingers.

The above three postures have very nearly the same effect upon the nervous system, the last one being the most powerful to be practised only by the healthy ; and exercises based upon these three postures, will aim at the development of the spinal cord, the strengthening of the internal organs such as the lungs, heart, liver, spleen, intestines, the improvement of breathing and the restoration of lost vigor, digestive weakness and the right working of the thoracic and abdominal organs in general.

### PADMASAN.

Sit on any level Surface. Fig. 103.

(a) Fold the right leg and place the right foot on the left thigh and also fold the left leg and place the left foot over the right thigh. This is called **Mukta Padmasan** as there is freedom of the upper limbs.

There is another kind, a little harder than the first one. (b) It is called **Baddha Padmasan** where, in addition to the crossing of the legs, you cross the hands as well in the back and hold the right big toe with the right hand fingers, taken from behind the back and hold the left big toe, with the left hand fingers taken from behind the back. Fig. 104.

If you are not able to hold both the legs with both the hands crossed from behind the back, you may begin the practice to hold on one side only and then with the other side alternately, until gradually you are able to hold both the legs with both the hands, as in figure above.

### SIDHASAN.

This is quite different from the above two and comparatively easier also.

There is a flat space between the anus region and that of the generative organs. The left heel is placed at this region and the right heel is placed higher above the left one, about six inches below the navel and in direct line under it. When you properly take your seat, your two knees must be symmetrically inclined towards the ground and touching it and the whole body is like a pyramid, the two knees indicating the two distant ends of the base, and the top of the head as the apex. Fig. 105.

The best time for practising these Asans is early in the morning, in empty stomach after the daily and usual evacuation of the bowels. You should in the beginning practise for a very short time and then go on increasing the duration of the sitting gradually and slowly without any sudden effort, until you can sit in one position for one hour. These Asans have a great power to correct the body and mind. If students practise all these three Asans or any one of them, these Asans will develop in them, Physical Courage, Great Will, Resolution and discipline the fickle-minded persons to be steady and strong.

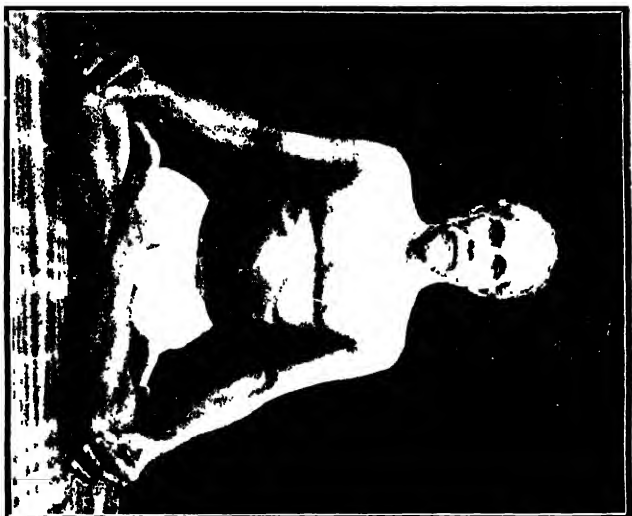


Fig. 103

Padmasan

Page 143



Fig. 104

Baddha Padmasan.

Page 144

A good Yogi for our girls who inherit  
weak backs and crooked bodies



Fig. 98

Page 145



Fig. 106

Page 145



Fig.  
107

Page  
145



Fig. 108

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**2. Pressing knees to chest.**

(a) Stand Erect. Take the right leg bent to the chest as high as you can. Resume standing position.

(b) Take the left leg bent to the chest. Resume. Repeat (a) and (b). Fig. 106.

**3. Imitate Running.**

Stand erect with hands bent. Imitate running by taking the legs alternately, up and down, rhythmically, counting 1, 2 and at the same time, moving the hands alternately, up and down. Fig. 107.

**4. Slipping and Sliding Bytaks.**

Stand erect. Go to sitting position to your front. Return back to standing position. When you go to sitting position, the hands go forward with a sweeping movement and when you return to standing position, the hands go back with a sweeping movement, spreading the chest. Figs. 98 and 108.

**5. Hopping Bytaks.**

Stand erect. Go to sitting position Fig. 108 and jump up into the air, removing both the legs away from the ground, Fig. 109 and go to standing position or sitting position as it suits you. This is a very vigorous exercise, to be attempted only by strong boys. Do not attempt exercises of this type without a Jhangiya or Langote. During the time of exercise, keep your lips closed, and avoid mouth-breathing always.

**Exercise PQ.****DAND.**

*Explanation* :—This is truly a typical Indian exercise full of Indian traditions and Indian sentiments. Its very meaning indicates the posture to be adopted. It is called "Dand" because in Hindu homes to do honour to the elders or God, one has to lie down prostrate on the ground, the whole body touching the ground (Sashtanga). This movement

of going down to lying down posture was then adopted to a certain special Sadhana of sun-worship, repeating the Gayatri, when the sun was just rising in the horizon. It was practised specially on the banks of the holy Ganges and Jamuna, the Brahmaputra and the Padma, the Mahanadi, Godavari, Krishna the Cauveri, Narbada and Tapti rivers.

We have seen some persons, do this exercise, with a wet piece of cloth round the navel and over the loins. But these people when questioned by us, told that their object was to worship the sun and not for physical culture. We found them anyhow to possess a sturdy looking, robust and strong body. It is called Surya Namaskaram or Sashtanga Namaskaram, meaning prostrations offered before the sun. Prostration or worship must be understood in its right sense, for you render worship when you lose yourself in admiration and awe, to a higher power. The sun in India is looked upon as a divine power and representative of God's High Will and worship is offered to the sun in that sense. If there is no harm in saluting ordinary mortals in power, there ought to be no harm in saluting the sun as the Eternal Representative Power in Nature.

But according to modern science we learn that the sun deserves better attention, than what we give it to-day. America and Europe are making great progress in taking the best advantage of the sun who is not only a great disinfectant but also a great energiser and life giver.

Apart from its religious and ethical significance, this exercise has effect upon the whole body, especially the chest, back and the hands. It is not one of the best, but it is the best of all exercises, in the whole field of physical culture. In fact, no system of physical culture can be complete without this particular form of exercise.

It must be, any how, mentioned that this exercise has not done a small amount of injury to our Indian



Fig. 126



Fig. 10'

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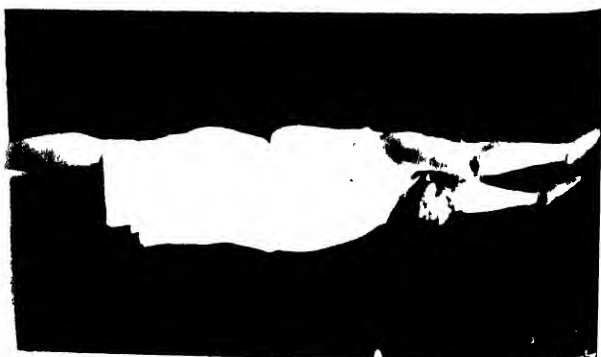


Fig. 110(a) Pages 140-150  
You can assume either the position  
of (a) or (b).

athletes. Any exercise may deteriorate and become harmful, if the spirit and the principle underlying it, is not followed. Most of our athletes look only to the form of this exercise and do it each in his own way, thereby breaking the essential principle of safeguarding the growth and preservation of the brain and nervous system. They are imbued with the one purpose of developing the body, at any cost, and do not look to the delicate structures, interposed in the skull, to preserve the brain, structures such as the Dura Mater, the Arachnoid Membrane and the Pia Mater. (Page 95).

Competition makes our athletes think of the number of times a person may do this exercise, as some of them go from five hundred times up to one thousand or even more. They have no inclination to think of the right execution of the true application of this exercise. Their only aim is to do it, do it a great number of times and do it any way they please. This has resulted in

1. Intellectual bankruptcy, but
2. Acquisition of wonderful staying power and strength, and
3. Unfortunately without any taste for symmetry, economy and beauty, amongst our wrestlers.

It is of course a matter of great credit that we have produced in our country, some wrestlers who have displayed wonderful agility, grip, vim and vigour, and are perhaps a wonder to the strong men of the other parts of the world. In wrestling, we stand first, and are second to none and attribute this achievement to the devotion of the Indian wrestler to this wonderful exercise. The evil results coming out of this exercise can be avoided easily, if the head is not tilted up with a sudden jerk, and each exercise is done after certain intervals of rest. To see that the exercise does not get deteriorated, we have closely followed the *Suryanamaskaram* method, with slight

modifications, to suit our present-day requirements and the capacity of our youngmen. The main exercise lies in pushing the body forward and drawing it backward (Nos. 4 and 5 below) without allowing the trunk and legs to touch the ground, as the body rests only on the palms and the fore-feet.

The exercise is done as follows :—

- I. Stand with hands uplifted, the fingers moving to and fro as if you are beckoning to the sun, as in Fig. 110.
- II. Go to sitting position, as in Fig. 111.
- III. Kick out the legs behind, as in Figs. 112, 113.
- IV. Take the head forward along with the trunk, as in Fig. 114.
- V. Draw the head backward, as in Fig. 115.
- VI. Assume sitting position as in II. Fig. 111.
- VII. Jump up and assume I. Fig. 110.

N.B.—When you assume sitting position in II and VI, the knees and elbows must be in juxtaposition, that is, very nearly touching one another.

The main exercise consists in movements IV and V. All the other movements namely I, II, III, VI and VII are all secondary movements. By these intervals of secondary movements, the hardness of the exercise is very much modified, energy is economised and fatigue is warded off.

Persons who are not fit, may do all the other Compulsory Exercises except this for 3 to 6 months and when they become fit, they can take up this Prince of Exercises, and not till then.

In our Indian gymnasiums, they do this exercise one after another in rapid succession, without giving sufficient rest, but imparting also shocks and jerks to the brain. This is carefully avoided in our system. If this is done early in the morning before the rising sun, it is highly inspiring. The only drawback with this exercise, is its specially hard nature. It cannot be called a gentle exercise. It comes under the



Fig. 110 (b)

Pages 146-150



Fig. 111

Pages 145-150

Pages 146-150

Fig. 12



Fig. 113—also Fig. 115



Pages 146-150



Fig. 114

P. 146. 150



heading of hard and violent exercises. As such, we generally do not advise every student to do this exercise unless he feels fit and his heart is normally strong.

(a) Those persons whose hearts are in normal condition and who do not feel any difficulty in doing it, but who feel inclined to do it, are advised to take it up and go on gradually increasing the number of times. A student who possesses the average strength, may begin with ten and reach about fifty, in three months as his maximum.

(b) Those persons whose hearts are nervous or who have the complaint of rapid beats or even palpitation, are not advised to do this, until they reach a certain standard of general efficiency. This should not frighten our young men who are generally of a nervous temperament. I have made experiment with thousands of students between the years 1912 and 1930 and perhaps about 40 per cent. are not in a fit condition to go through this at the beginning. Out of this 40 per cent. of young men, more than 30 per cent. will become fit after gaining strength through other exercises given in this book, within about a period of 3 to 6 months of practice. So there is no cause for despair. A question generally put to us is, how many times a beginner should do this exercise. This is very difficult to answer.

Let him begin with 5 times a day slowly and steadily and no more, if he belongs to the weaker class. Let him continue to do it, both morning and evening, for a fortnight, very regularly, and watch the result.

Then, he can increase the number to ten times. Let one fortnight be given for this trial. You need not become impatient. Then after this one month, you can increase it, by five more for every week; and so on, until you reach the maximum of thirty, but do not perform all the thirty movements at one stretch. But do it at intervals, in the course of doing

your other exercises, namely, A, B, C, D, E, F, L, O, S, X, by interposing it between each of the above mentioned exercises.

(c) Finally the student who is strong, may not be in need of any advice, if he is prudent, and for the sake of convenience, we advise him to start with fifteen and reach the maximum of one hundred in six months. Do not increase the number any further than one hundred until you are sure that you are improving in your health of body and mind.

*N.B.*—The one fact already mentioned elsewhere that you should not do any exercise continuously for a very long time and reduce it into mere routine and monotonous movements, should always be borne in mind. This book is meant for the weak as well as the strong. As our object being the improvement of the human race through the regeneration of the individual man, we should pay the best attention to his all-round development. His height, build and the organic structure must be improved in the first stage and then comes the more difficult task of building up, beauty and grace, and finally the equipment of a consolidated and co-ordinated nervous system, capable of better endurance, wider expression and greater application.

We have modified the main exercise in such a way that there are no shocks or jerks given to the brain. The movement makes a majestic curve of going forward and returning back to its former position in a wave-like movement of the body. This backward motion is a little taxing and hard, but develops in us hardihood and stamina and it makes the exercise rhythmic. The following are the other varieties of Dands:—

## **2. Balance Dands.**

From position III, take the body up and down, bringing the nose very near the ground.

In this exercise everything is the same as in the previous exercise, but instead of taking the body





forward and backward, the movements here, are, taking the head and trunk as one piece, up and down, the nose reaching very near the ground before rising.

### 3. One Leg Folded.

From sitting position in figure 11, kick out only one leg alternately and perform the forward and backward movements. Fig. 117.

This exercise is similar to No. 1, except that instead of both the legs being stretched, only one of them is folded alternately during this exercise.

### 4. One Leg Raised.

This also is same as No. 3, but instead of folding one leg on the ground, we raise one leg from the ground and rest the body on the other leg. Then similarly repeat this exercise by lifting the other leg alternately. Fig. 118.

### 5. Twisting Dands.

Same as No. 1, but instead of moving the trunk and head balanced on both the hands, you can lean on the right side and do the movement putting more pressure upon the right hand. Fig. 119,

Then you can lean on the left side, putting pressure on the left hand, and perform the exercise.

In this exercise the trunk takes a peculiar twisting movement.

### 6. One Hand Dands. Fig. 120.

There is another kind in which we remove one hand from the ground and perform the Dands, resting only on one hand. These are very hard and only experts can do it, and this is not for beginners. This is a feat of very great strength and endurance.

### 7. Circling Dands.

These Dands are very good especially for boys and girls. These create activity and strength, combined with Physical Courage.

From position Fig. 121 (a), assume position Fig. 122 (b), by taking the right leg in a circular

movement as the dotted lines show and further take it to position Fig. 123 (*c*), and extend the left leg to position Fig. 124 (*d*), and perform Dands with the right leg lifted up, Fig. 118.

Repeat similar movements with the left leg.

---

### Exercise X.

#### TALLNESS, ACTIVITY AND BEAUTY.

This exercise is meant for tallness and activity. It has an all round effect upon the abdomen, chest, back, hips and waist. It removes fat and gives a good shape to the hips. This is a very good exercise for our women who are given no chance to improve their lungs and the body in general. We are to-day only pigmies when compared with the intellectual greatness of our forefathers. In body as well, we are no better than mere dwarfs. Our great ambition is to improve the race. We want to see beautiful models in men and women. We do not want to search for beauty in pictures and novels. We want to realise it in our common day life and cultivate it with a set purpose and not leave it to chance. 'A thing of beauty is a joy for ever.' Symmetry of form is beauty. Harmony of thought is Anandam or beatitude. The poet has come from his ramblings in nature, to the homesteads of man, to realize all the wealth of power and beauty in man who is a significant part of nature. Let us give the function of cultivating tallness so that we may have practical aesthetics in our mode of life. Function creates structure.

While doing this exercise, in all humility and grace, by bending your head down and taking your hands to the ground, you draw the magnetic power from the bosom of the earth and store it up in you. We want Sadhana and meditation and not mere mechanical movements. While doing this exercise be conscious of a great transformation that is going





on within you. Do not be dull or indifferent. Be alive to your surroundings. There is Health everywhere—Power everywhere—and Beauty everywhere.

### 1. Bend Body to front.

*Explanation* :—Stand with your heels together and toes apart. Keep your fists close to your chest on either side. This should be considered as your usual position to which you must return whenever we say, Resume position. Fig. 125.

Now raise both your hands over-head and take them both fully stretched down to the ground, with a sweeping movement, until you touch your toes, without bending the knees. Fig. 126.

Resume position, taking the hands back with the same sweeping motion upwards ; keep the mouth closed and breathe through the nostrils.

Breathing. Exhale while bending down ; inhale while rising up.

### 2. Bend body to the sides. Fig. 127.

This consists in keeping the legs as straight as possible and bending the body as in the previous exercise once to the right and then to the left alternately, by slightly twisting the trunk at the waist.

Each time you bend down, you must rise up, before you bend down again.

### 3. Bend, single hand touching single foot.

*Explanation* :—We have made the above exercise a little bit, artistic, in this section. The hands and feet are adjusted very artistically, when the motions made in this exercise.

a) Take the left hand slightly backwards to the waist and raise the right hand in the act of overarm swinging and bend down until the right hand, touches right foot, kept pointed up. While the right hand is being taken down with a sweeping overarm movement, the right leg is placed one step ahead to

the front, in the act of meeting the right hand, and the left leg is slightly bent, without being removed from its original place. Fig. 128.

The weight of the whole body now rests upon the bent left foot. Mark the right foot is tilted up, but straight. Now in resuming your position, the right hand should be taken back in the same way as it came, by describing a semi-circle, to its original position.

(b) Now, repeat the exercise with the left hand. How? By taking the right hand slightly backwards to the right waist and making with the left hand the same over-arm bowling movement, to meet the left leg, taken one step forward and the left foot tilted upwards. The right leg is bent here.

When after good practice you do this exercise, it will appear to be some beautiful *semi-circular* movements of the hands going down with a sweeping motion, to meet the legs and the legs in their turn alternately taken forwards and backwards. Notice that the hind leg is bent and the front leg is kept straight. The hind leg rests upon the whole foot, whereas, the front leg rests upon the heel alone, the toes being pointed up. Repeat (a) and (b).

#### 4. See exercise section No. 1.

(a) Repeat exercise No. 1 with a slight change in the leg, namely, when you bend and go up, bring the right leg to the front; then when you bow down, take that leg back; again when you rise, take the other leg, namely, left leg to the front. Fig. 129.

(b) Repeat No. 1 with both the legs brought to front. Fig. 130.

*Explanation:—*It is like the *hopping on both legs*, taking a jump of one step forwards, where hands go down and one step backwards where hands go up.

#### 5. Quick Movements.—1, 2, 3, 2.

*Explanation:—*This consists in going through the movements very rapidly by counting 1, 2, 3,





While counting one, both your hands must reach the ground, by a sharp jerky movement, taken straight down. With No 2 the hands are taken rapidly to the chest. No. 3 hands are lifted up. Then you go back to position 2, that is, to the chest and then to 1, to the ground. The beauty of the exercise consists in doing it very rapidly.

## CURATIVE EXERCISES.

The following three exercises given in succession, namely, F. L. and O. are very important for their curative power. They exercise the various organs and glands in the thoracic and the abdominal regions. The spinal column or "Merudanda," in our back, is also physiologically exercised without having any nervous fatigue. They are also very essential for our girls and women. Since these exercises were devised and formed by us on the basis of certain well-known Yogic Asans and the principles underlying them, they are well adapted for the young as well as the old. In the case of adults and old persons, up to their sixtieth year, we have thousands of instances in which very satisfactory results were obtained. The persons who were benefitted belong to different professions, chiefly Doctors, Professors of Colleges, High school Teachers, officials and merchants. Some of these exercises were put to practice by eminent educationists and scientists of our country, to wit, the renowned Sir Jagadish Chandra Bose, who welcomed our system so far back as the year 1917 A.D., the late Dr. Sunder Lal Vice-Chancellor of Allahabad and the late Mr. U. N. Basu, and Dr. D. P. Sarbhadhikary of the Calcutta Universities respectively.

All exercises should be done with lips closed. Slow movements performed with a meditative attitude, bring about curative results. Do not attempt the application portion of these exercises until you are

far advanced and you are thoroughly conversant with the underlying principles of these Yogic exercises. There is absolutely no danger in the practice of any of these exercises. Patient and persistent efforts are needed to secure good results. There is one important point to be noticed by our students. It is this. The full Yogic Asans are not given in their orthodox forms. Our attempt has been to avoid the difficulties in the practice of Yoga and only take up those essentials which can easily be assimilated into our physical culture system. More than ninety per cent. have not got the mood or capacity to walk on the thorny and trying path of Yoga, though in the long run, in spite of all hardships, Yoga leads to power and glory. What we have done is that we have devised a few exercises based on certain main Yogic Asans just as riders are based on geometrical propositions. Compare the real Shava Asan given under Exercise O and the riders 1 to 5 based on it. We draw the attention of our students to the section on "Muscles or Health" in this book as regards our ideal of Health, Strength and Longevity.

### Exercise F.

#### DHANURASAN.

In this exercise, the body is bent and stretched like a bow. There are five parts in this exercise.

##### 1. Full-Bow.

*Explanation* :—(a) Lie prone fully stretched with the face towards the ground. (b) Stretch your arms on either side, at right angles to the body. Then, slowly raise your hands and feet from the ground. (c) Bring your hands to the front, join them together palm to palm. (d) Keep them lifted up and fully stretched, with your head held up and looking to your thumbs and at the same time,





keep the legs raised together and stretched in full without bending the knees. This is bending the body like a bow, the one end of the bow, is the head and the other end of the bow, the two heels together. (e) Resume your original position, as in figure (a). Repeat these movements, alternately, rising up and going down, as in (d) and (a). Fig. 134.

## 2. Half-Bow.

*Explanation* :—This consists of two parts :—

(a) Keep the legs firmly on the ground and lift only the hands, as in figure 135.

(b) Keep the hands firmly on the ground and lift only the legs, as in figure 136.

(c) Repeat *a* and *b* alternately, in such a way, as to appear that you are rocking your body, up and down, like a see-saw.

## 3. One-side-Bow (Single leg and hand). Fig. 137.

This also consists of two parts :—

(a) Put your head on the left arm, as in figure. Hold your right ankle with your right arm and lift both of them up, like a bow, without bending the arm. Do not pull the leg, but lift it clean above the ground and hold it aloft. If you cannot lift it, then keeping your hold upon the ankle, kick up the leg and you will come to the intended position.

(b) Repeat the above with your left hand. That is, rest your head on the right arm, kept straight, and hold the left ankle with your left hand and lift both of them up into the air. Then bring the hand and leg, that is, the hand holding the ankle, down, in a relaxed and loose condition, to the ground. Again lift them up and bring them down. When they are lifted up, the leg is bent, but not the hand. The hand should be stretched tight like the strings of a bow. This point of keeping the hand stretched, while the leg is lifted up, must be always borne in mind, in all the following sections of this Asan.

Repeat (a) and (b) alternately five times.

#### 4. Cross-Bow (opposite leg and hand).

*Explanation* :—(a) Before commencing this exercise a little adjustment is essential. If you want to hold the right hand and left ankle, then beforehand, stretch the left hand on the ground, to the left corner and keep your head with the left ear touching the ground and look at your left hand. Then with the right hand hold the left ankle and lift the left leg, bent up. Notice that the right shoulder inclines towards the ground, during this part of the exercise.

(b). Before beginning its counterpart opposite movement, stretch the right hand on the ground to the right corner and keep your head slantingly and look at your right hand, then with the left hand, hold the right ankle and lift the right leg, bent up. Notice that the left shoulder and left ear incline towards the ground. Repeat the above two sections (a) and (b) alternately, Fig. 138.

#### 5. Round-Bow. Fig. 140.

Bending the body like a bow, holding the right leg with the right hand, and left leg, with the left hand, as in figure. Keeping the hands and legs in this round position, you can roll also from side to side ; or sink down to the ground and raise the body up as in figure.

**I. Physical Effect** :—This exercise is specially meant for the spinal region and also for the neck, back, the abdomen, kidneys, spleen and liver.

**II. Special Application** :—1. Take your mind to the navel region and meditate upon the Solar Plexus or manipoorak, No. 5, Fig. 49 and Fig. 55, and think that you are energising the whole body.

2. Similarly think of controlling seminal wastage and assimilating this essence of life into the system.

3. Think of strengthening the digestive processes and the action of liver and kidneys.

**III. Practical Use:**—Since it puts the body to all kinds of positions, it creates in you endurance to hardship. It removes stiffness in the body and makes it plastic. It helps in games like Cricket, Hockey, Football, Running, Swimming and Riding. It helps the artisans, artists and labourers in the fields.

**IV. Pancha Thathwa:**—This exercise comes under Jalathathva or the Zone of Liquids. Hence it develops in you the spirit of *Adjustment* and *Motion* two of the chief characteristics of water. It removes lethargy and indolence from the body and instils activity and harmony in the system. L and O exercises also belong to the same type.

### Exercise L.

#### THE PASCHIMUTHAN ASAN.

*Explanation:*—This exercise and its sections are derived from the Paschimuthana Asan. Western physical culturists, including Eugene Sandow, Macfayden and others, have made a liberal use of this Asan. This is a very old exercise: even older than the Dandavath exercises known by different names in India as Buk-Dands in Bengal, Dandals in South India and Dands in Punjab and Bombay and the United Provinces.

What Brahmacharya exercise E. is to our young men, so the Paschimuthan Asan is to our girls for womanhood. We advise this exercise to be given to our girls; in fact, we have taught this one exercise, rather the first part of this exercise, in hundreds of girls' schools we have visited and also in all the meetings arranged for ladies exclusively. Everywhere it was received very well. It has a wonderful effect upon the abdominal organs of the human system and the spinal cord. The ideal form of this exercise is, to bend the head down to touch the knees, when you

are sitting with your legs stretched and holding the toes with your hands. If you cannot hold the toes with your hands, as there are many who cannot do so, then perform the movements of taking the hands towards the toes as far as you can reach, without bending the knees and in a week or two, you will be able to hold the toes with your fingers.

1. (a) Lie down flat with your back on the ground. Take your hands back well-stretched behind the head. Keep the whole body relaxed and loose, before you commence the exercise. Fig. 141.

(b) Raise your hands and get up to the sitting position, and without bending the knees, touch the big toes with your forefingers. Fig. 142.

Resume your lying down position, slowly taking the hands back, till you touch the ground.

Repeat the sitting position and go back alternately.

2. Sit legs stretched before you without bending the knees.

Now perform movements with both the hands alternately, as if you are churning or drawing something from the toes. This exercise is meant for the abdominal muscles, so you must not stiffen and contract your hand muscles, but keep them supple. Fig. 144.

Take the right hand to the right toe, when it is brought back you must bring it slowly to the abdomen as if you are actually drawing something, while at the same time you must draw the muscles of the abdomen inwards and keep them pressed back. Similarly take the left hand to the left toe.

3. Sit as in figure stretching your legs straight on the ground. Fig. 145.

Raise both of your hands straightly up keeping both the hands well pressed back until they are fully raised Fig. 146 and take them forward to reach the toes. Fig. 142.





Again go back to your original position, by taking the hands just in the same way as they went to the toes.

The main point of this exercise lies in pressing the hands as far back as possible, while lifting them, exerting some pressure at the shoulders.

4. Sit as in Fig. 143.

(a). Keep the hands at the chest, Fig. 145.

Touch the toes—Fig. 142.

Again take them to the chest Fig. 145.

Turn to right, put both the palms on the ground, press your head between the two hands till your nose touches the ground. Fig. 147.

(b) Rise and take the hands to chest. Fig. 145.

Again to toes. Fig. 142. To chest. Fig. 145.

Turn to left, put both the palms on the ground, press your head between the two hands, till your nose touches the ground.

Repeat (a) and (b) alternately.

#### **4. Single hand and Single leg meeting.**

(a) Lying down keeping both the hands stretched behind, lift the right hand, to meet the right leg, and then resume position of hand and leg. Fig. 148.

(b) Repeat similarly with the left hand and left leg and resume position.

Repeat (a) and (b) alternately.

#### **5. Both hands meeting both legs.**

This is similar to the above No. 4; only, in this part, both the hands are taken to meet both the legs, raised above without bending the knees. Repeat raising hands and legs, and resume position by taking back the hands and legs to the ground. Fig. 149.

If parts 4 and 5 cannot be done without bending the knees much latitude is given to do the exercises in any way you like, provided your hands and legs move from the opposite direction to meet over the trunk and go back to their original position.

**Exercise O.****SHAVA-ASAN.**

This is also called Mrityunjaya Asan, the Asan that conquers death.

Lie down on your back. Relax the whole body and breathe slowly taking long breaths. This is yogic shava-asan. Fig. 150.

**1. Bending body side-wise, touch the knee.**

*Explanation:—*(a) Lie down on the ground with face to the sky, Fig. 150. Bend to the right side and touch the right knee, and at the same time lifting your head and looking at the knee. Fig. 151. Come to the original position, with your head to the ground and hand to the side. Fig. 150.

(b) Repeat the same to the left side and touch the left knee with your left hand, raising your head and looking at it.

Repeat (a) and (b) alternately, but each time coming to the resting position. Do not go from the right to the left position or from the left to the right position, without resting the head on the ground in the middle or neutral position.

**2. Shooting at the toes, or Churning. Fig. 152.**

From the lying down position, lift both the legs one foot high and keep them straight and lift also the head and trunk, resting only on the gluteus muscles and perform slowly and steadily the drawing movements with your hands, alternately shooting at the toes or as if you are churning something.

**3. Single Knee-Bending or Knee-Kissing.**

Lie down as before, on your back.

(a) Bend your right leg on your chest, hold the right ankle with your right hand and your right knee with your left hand, and press the bent, right leg, over the liver region and the chest; and at this stage touch the knee with your chin or nose. While





you are in this last position, the left leg must be kept balanced without touching the ground. Fig. 153.

(*b*) Now change the position of the legs, without touching the ground ; that is, the left leg is folded on the chest, on the spleen region, the left ankle is held by the left hand, and the left knee, by the right hand. When the chin touches the knee, the right leg must be kept balanced straight, one foot above the ground, without touching it.

Notice that the same leg is held by the same hand at the ankle portion, to keep the leg straight without allowing it to bend crooked.

Repeat (*a*) and (*b*) alternately, without allowing any leg to touch the ground, until you finish the exercise.

#### **4. Double Knee-Bending or Knee-Kissing.**

(*a*) Fold both the legs on the chest and hold them pressed tight over the chest and touch the knees with your nose, thrice, each time taking the head down, but keeping the legs folded on the chest as before, without removing them, until you touch each knee thrice. Fig. 154.

In touching the knees, you must touch right knee once and then the left knee, separately, and take your head down. Again lift your head and repeat the above movement of touching the knees and so on until you have done thrice.

(*b*) Extend the legs straight. Repeat (*a*) and (*b*) alternately, when legs are extended, they may or may not touch the ground.

#### **5. Kidneys Exercise.**

(i) Lie down on your back and keep your palms on the chest as in Fig. 155. This is no. 1.

(ii) Fold the legs as in figure 156. This is no. 2.

(iii) Lift both the feet off the ground and place it to your right side, so that the two heels are on the

right side and your knees are inclined to the left and lift your head and look at the heels. This is No. 3.

Go to position (ii), then (i), Come to position (ii) and put your feet to the left side. Repeat 2, 1, 2, 3.

*Explanatton.*—Placing the two feet to the right or to the left, is the Main Movement No. 3, and the others are secondary ones. You should not change the position of your trunk or hands, but only turn the hips in placing the feet to right or left. Notice that the Main Movement is a hip movement. Fig. 157

### SARVANGA ASAN.

1. (a) Lie down on your back keeping the hands by the sides. Raise both the legs up well balanced and support the hips with your hands as in Fig. 158.

*Explanation* :—In the beginning it may not be possible to raise the legs high and straight. Constant practice will bring you nearer the goal. Do not attempt this without some one helping you if you are a beginner for there is a danger of the neck muscles being sprained.

1. (b) Repeat the above Exercise, without supporting the hips with your hands, but pressing the elbows well to the ground and holding your breath. Fig. 159.

2. Take both the legs over head with your hands resting on the ground behind and beyond the head. Fig. 160.

Go to the sitting position, by taking the hands and legs with a swing as in figure—You can perform the see-saw movements, lying down with the back to the ground and legs raised up and taken back towards the head and again assuming the sitting position. Fig. 161.

### 3. Inverted Padmasan.

Lie down on the back and raise the legs as in No. 1 and slowly fold the left leg over the right thigh









and the right leg over the left and keep straight as in Padmasan. Fig. 162.

4. Continue the above posture and make see-saw movements with the body in padmasan condition. Fig. 162 while lying down and Fig. 163 when you get up to sitting position.

5. From the sitting position of No. 4 above, perform the following three movements.

(a) Put both your palms on the ground to the front and bend down and touch the ground with your nose. Resume position. Fig. 164.

(b) Similarly bend to the right side place both palms to the right and put the head between the two hands and touch the ground with your nose.

**Resume position—**

(c) Similarly to the left—Put the palms to the left and touch the ground between the hands with your nose.

Note that in (b) and (c) when bending the head there will be a slight raising from the ground of the left and right legs in their folded condition.

These exercises under the Sarvanga Asan combined with the Padmasan are very good for the youth and especially for our girls and ladies.

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### **Exercise YZ.**

#### **PRANAYAMA,**

This exercise includes in itself certain important principles of Yoga and is based upon certain Yoga Asans of the type of the Kukut Asan.

This is more a breathing exercise than a muscular one. It develops discipline in you. First learn to do the exercise well before you go to the application

of the exercise because the latter is rather difficult. The movements must become thorough and automatic through constant practice and then the application will become interesting and inspiring. You should never expect sudden and miraculous results. The improvements will be gradual but slow so that you must go on doing the exercise instead of questioning and doubting every day what improvement you are making each day.

1. Sit balancing on the toes.
2. Hook the fingers. Fig. 166.
3. Take them above the neck, inhaling. Fig. 167.
4. Exhale. Fig. 167.
5. Rise up, inhaling. Fig. 168.
6. Sit down exhaling.
7. Inhale.
8. Exhale, bringing hands to the navel. Fig. 166.

The above exercise can be done in one breath, that is, once you take the breath, you do not give it out until you finish the rising, sitting and bringing-the-hands-down movements.

This exercise is meant for Lung Power, Thought-Power and Soul Power.

**Special Application.**—In the introductory portion as well as under the title of Brahmacharya exercise we have already dwelt upon the plexuses or dynamic batteries of nervous ganglion in the sympathetic nervous system and spinal cord as well. These plexuses are in their crude form in the sympathetic nervous system, with their corresponding representative centres in the spinal cord as well as in the brain. In the spinal cord, the centres are not developed at all. All that exist are only nuclei with the possibility of future development and formation. The sympathetic system is ruling the involuntary muscles and organs. The development of the spinal centres and their fuller formation will lead them to make certain functions more and more voluntary

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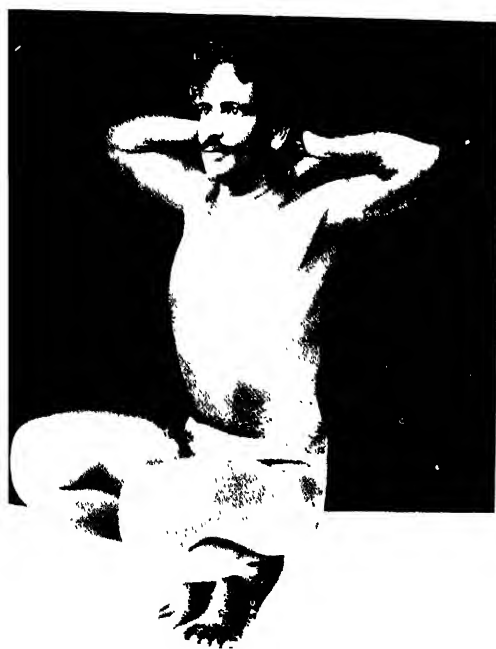


Fig. 167 Page 166

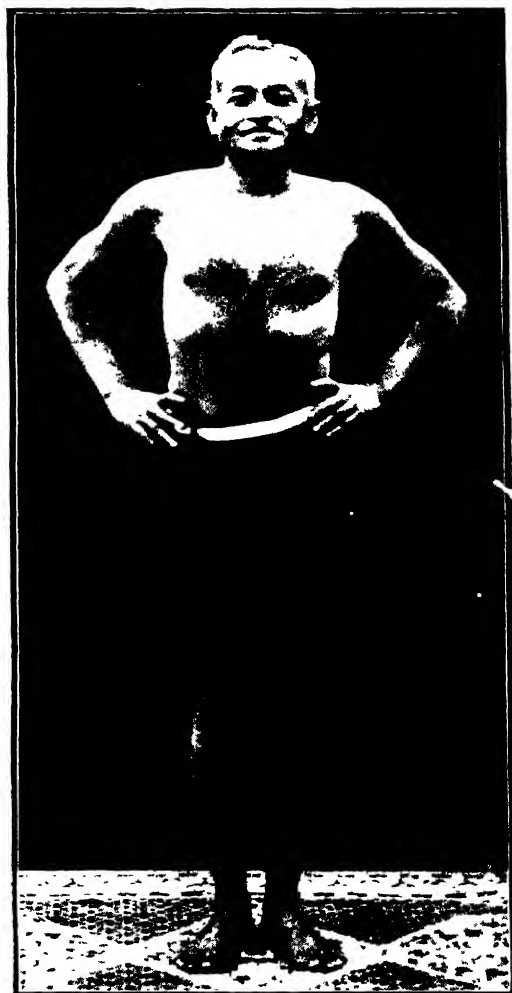


Fig. 169

from their original involuntary condition. Then man obtains a dynamic power over nature. If a human body is cut you will notice the sympathetic ganglion of nerves on the inside of the back imbedded in its muscular walls.

The spinal cord is quite different from the sympathetic nervous system which receives its nerves from the cord. The spinal cord runs within the spinal vertebrae and kept in a very safe condition like the insulated cables of electric installation. If the spinal cord was not a delicate instrument, entrusted with important functioning, nature would not have kept it fortified within bones of good thickness and peculiar structure. The bony ridge keeps the cord in invulnerable condition. This special bony structure which nature has endowed man with, proves conclusively that the safety of the nervous system is essential for life. Man is born with great possibilities before him and our Sadhana must be directed towards control, conquest and realisation of the nervous system.

**Application No. 1.**—While doing the YZ exercise think of any one centre such as the Mooladhara, etc.

**Application No. 2.**—While rising up from the sitting position, think of the seven centres one at each time beginning from the Mooladhara up to the Sahasradalpadma.

While sitting down, think of the same centres from the top, Sahasradalpadma downwards to Mooladhara, one by one as you go down.

**Application No. 3.**—For Physical development. Concentrate your mind on the lowest three centres, Mooladhara, Swadishtana and Manipoorak.

**Application No. 4.**—For emotional development. Concentrate your mind on the fourth and fifth centres namely Anahutha and Vishudha.

**Application No. 5.**--For intellectual and spiritual supremacy in man. Think of the Agneya and Sahashadala Padma.

The last three applications require some explanation first as to the arbitrary division that we have made and then as to the efficacy of the exercise.

If you study the human body you will notice that the legs and hands are only massive structures for effecting movement and manipulation. Next in importance in complication of structure and function comes the trunk. Then last of all the head, of a still more wonderful structure with its marvellously awe-inspiring function of thinking, commanding and feeling. See Figs. 49 and 55 for the various plexuses.

In this exercise we are concerned with the trunk and the head. The trunk of the body is further divided into two parts.

1. The thoracic cavity.
2. And the abdominal cavity, both separated by a muscular wall called the Diaphragm which moves up and down like a thick screen.

These different applications are in accordance with the natural divisions of the human body as explained below.

1. All physical and coarser function of digesting the food, the separation of the nutritious portions and their assimilation, and the removal of the refuse matter through the excretory organs, all these take place in the abdominal region. There lie in this region the generative organs for the propagation of the human species.

All the above functions are physical in nature and so we call them sthula or physical kingdom. This region is under the local self Government of three Boards which form their dynamic union as Mooladhara, Swadishtana and Manipurak.

II. The second region is connected with certain finer functions. In this region we find the coarser food we take changed into blood and pumped into the different parts of the body by that wonderful mentor, the Heart. The impure blood is purified by the great bellows, the lungs. It is therefore the region of circulation of blood and respiration of air. Air and blood are finer in structure and function, than food taken into the lower region. The food which we take awakens our senses before it develops our consciousness.

**Food is converted into energy. Energy flows into our Senses. Our Senses develop Consciousness. Our Consciousness gives birth to Individuality in man. Individuality leads to Divinity.**

Every human being yearns for this **Realization.**

The second region is the region of the play of the senses or emotions. It does not mean that the senses in man are located here. No, far from that. This region responds to the play of the emotions in man. A man's respiration and pulse are effected markedly by the various emotions. When a person is angry, his respiration changes and the pulses grow rapid. Besides this it is a very common saying in all countries amongst all races, to identify the heart region with good or bad feelings. The thoracic cavity or the chest, therefore is identified with emotions because by controlling the breath and also by guiding the economic functioning of the heart, you acquire a good deal of power over your emotions thus allowing the higher feelings to grow purer and better and the lower ones become subdued and silenced. The emotional region is under the control of two Boards which constitute the local Government situated in the thoracic cavity. These two dynamic centres are called Anahutha and Vishudha, situated respectively in the heart,—Hridayasthan, and the throat—Kanthasthan.

III. The third and final region, namely, the skull is the seat of the intellect in man. This third region performs the subtlest function in the human system. In the smallest space possible, about half the size of a cocoanut, the greatest of dynamic instruments is set up by God. It is a marvel to find out how the brain cells feel, think and decide. There is nothing more wonderful in the universe than man and there is nothing more wonderful in man than his brain.

Food is coarser than blood, Blood is coarser than air. Air is coarser than thought. Thought is coarser than the soul. The soul is the finest of all. The soul of all culture is the culture of the soul. The third region is governed by two Boards.

The First located behind the Bhrumadhya or forehead, the sixth centre, called (a) the Agneya, corresponding with the Medulla Oblongata and (b) Cerebellum, a little above Agneya.

The Second composed of elected representatives located in the Cerebrum or the Sahasradala Padma. These representative nerve centres are connected with the whole body, with some extra-ordinary centres for evolution and development.

Sahasradala forms the Central Government, and the six plexuses below from Agneya to Mooladhar form the Local Governments. These constitute the Parliament that governs the whole Kingdom of man with the soul as the Sovereign of the Body Republic.

Hence these three broad divisions are made as follows :—1 Physical. 2 Emotional. 3 Intellectual.

In applying the YZ exercise for the development of these respective spheres you must put your mind on the corresponding centres in those regions.

This exercise should always be done in a meditative mood. The eyes should be kept steady as in gazing at an object without letting the eyelids fall



Fig. 170

Page 171

For fig. 171, see fig. 78 p 126 picture page 209 or fig. 110 p 146,  
picture page 232

For fig. 172, see fig. 90 p 133-134, picture page 222.

For fig. 173, see figures 5, 6, 103 or 104.

For fig. 174 see fig. 141 or 150 and make movements with the legs as directed in page 171.



Fig

Page



Fig. 177

Page 172

as in winking. The head must be kept erect, and not leaning to any one side. Gazing is not staring.

2. (a) Stand Erect. Take your hands up inhaling.

(b) Sit down, exhaling your breath and letting the hands go down. Fig. 172.

Repeat (a) inhaling. Repeat (b) exhaling.

Repeat (a) and (b), alternately.

3. Stand Erect.

(a) Inhale slowly and at the same time raise your hands from your side over the head. Fig. 171.

(b) Exhale, letting the hands down slowly and gradually.

Repeat (a) and (b) alternately.

4. Stand Erect.

(a) Looking down at your toes, keeping hands on hips. Inhale slowly and at the same time, raising all toes from the ground. Fig. 170.

(b) Exhale slowly, putting the toes down and rising on the heels.

Repeat (a) and (b) alternately.

N.B.—You must feel strongly when you inhale, that you are inhaling energy from your toes.

5. Sit in Padmasan or Sidhasan. Fig. 173.

(a) Slowly draw your breath from the throat, as full as possible, without straining your lungs. This is called Poorakam. (b) Retain the breath for some time convenient to you. This is Kumbakam.

(c) Slowly give out the breath from the throat. this is Reyachakam. a, b, c form one Pranayama Perform 12 such Pranayamas to begin with, three times each day.

## SPECIAL CURATIVE EXERCISES.

To remove Constipation, Dyspepsia, etc.

1. (a) Lie down on your back, raise right leg one foot above the ground and make circling movements first to the right and then in the opposite direction, to left. Fig. 174. Resume position.

(b) Repeat similar movements with the left leg..

2. From the same lying down position. Circle both the legs separately in the opposite direction and again in the reverse direction. Fig. 175.

3. From the same lying down position, circle both the legs together in the same direction, first from right to left and then from left to right. This is a very good exercise for our girls and women. Fig. 176.

4. (a) Lie down on your back. Take the right leg crossing over the left one Fig. 177. Keep the left leg straight, but the right one folded. At the same time, the trunk and the upper limbs must be kept inclined to the opposite direction that, is, to the right. The right knee must touch the ground.

(b) Reverse the movement with the left leg crossing over the right and the trunk inclining to the left side and left knee touching the ground. Fig. 178.

5. (a) Sit with your right leg stretched on the ground and the left leg crossed over the right thigh.

Hold the left big toe with the right hand and right big toe with the left hand and raise the right hand and left leg to the right temple.

(b) Change the hands and legs in the reverse way, that is, fold the right leg over the left and hold the right toe with the left hand and raise the left hand and right leg to the left temple. Holding left toe with right hand. Fig. 179.

6. (a) Sit as in 5 (a), but hold the left toe with your left hand taken from behind the back and hold the right big toe with your right hand. Fig. 180.

(b) Sit as in 5 (b), but hold the right toe with your right hand taken from behind the back and the left big toe with your left hand kept straight.

7. (a) Sit as in fig. 181 holding the left big toe with the right hand and the right big toe with the left hand—Notice the hands are crossing each other and the right hand is over the left.



Fig. 179

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The Author's youngest son, Krishnamoorthy



Fig. 180

Page 172

183 and 186, p. 173, are similar to fig. 179, only there is some change in the hands. Fig. 184 and 185 are similar to 181.



Fig. 181

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Fig. 187

Page 17

Sit as in figure, 181 but change your hands and hold the left toe with right hand and right toe with the left hand.



Fig. 186

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(b) Fold the left hand and right leg over the left thigh—Resume position 181.

(c) Fold the right hand and left leg over the left hand, the right hand must be drawn as far as the right temple. Fig. 183.

8. (a) Sit as in 181, but put the left hand over the right. Fig. 184.

(b) Fold the right hand and left leg over the right thigh—Resume position. Fig. 185.

(c) Fold the left hand and right leg over the right hand and see that the left hand is taken near the left temple. Fig. 186.

9. (a) Take the left leg over the neck and hold the left toe with the right hand and hold the right toe with the left hand. Fig. 187.

(b) Reverse the legs and hands.

#### 10. The Donkey-Rolling.

Lying down with legs folded roll from side to side, pressing the upper and lower back to the ground, as it suits you. This is called familiarly, by my students, the Donkey-exercise. Fig. 188.

This is a favourite exercise of mine, to relieve pain in the back. It is really a very good exercise of relief after great exertion. The only precaution is that it should be done on hard and even surface and the dress you wear must not be protruding on the back and waist, to spoil the evenness of the surface.

### EXERCISES FOR GIRLS.

The bodily and mental constitution of our boys and girls, is not entirely the same. The physiological function of breathing, circulation of blood, digestion of food and excretion of human wastages are the same. But there are certain peculiar functions of mind and body which are separate in man

and woman, though intended to be complimentary of one to the other. There are certain things in man which are not in woman, and there are certain things in woman which are not in man. Hence man and woman are complimentary to one another. We have, therefore, in this elementary course of our First Volume, given a series of exercises which are suitable for the development of our girls. There are some higher and simpler exercises for grown up men and women which are of some special value and we have incorporated them in our Second Volume of the *Coming Man*. Exercises for girls are divided into I. General. II. Special.

I. General Exercises are those which are common to both boys and girls. They have been discussed thoroughly from pages 119 to 173 of this book as Compulsory and Curative Exercises. We have made experiments upon our girls and found them useful, effective and uninjurious. Our girls can take them up and do them with care and judgement, without, of course, competing with our boys. Let them begin with a small number, say five times each exercise, and increase very slowly and gradually with great caution. They must avoid straining and especially any strain in the pelvic region. So they should do the E and PQ exercises within certain limits.

Our girls ought to keep in their view the idea to develop their torso or the bust, with special reference to the pelvis, chest and the spinal region. We have very weak specimens of womanhood who are unfit for motherhood. Besides this general debility, there is one other important fact which has been completely lost sight of in the case of women. There is a sort of dislocation between their body and mind. There does not exist that harmony and partnership which ought to prevail between their body and mind. Complete and continuous agreement in this direction will discipline the productive and creative capacity

For Fig. 189 page 175, see fig. 141 p. 160, picture page 246



Fig. 191

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Fig. 190

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Make circular movements with the hands.

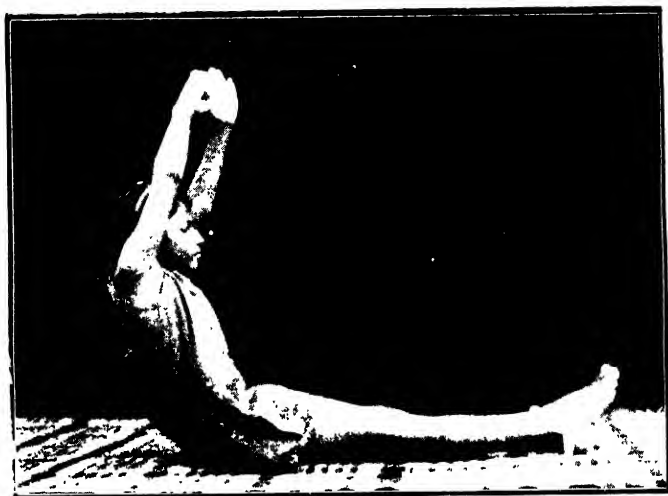


Fig. 192(a)

First position.

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Fig. 192(b)

Second position.

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Fig. 193 Third position. Page 1.

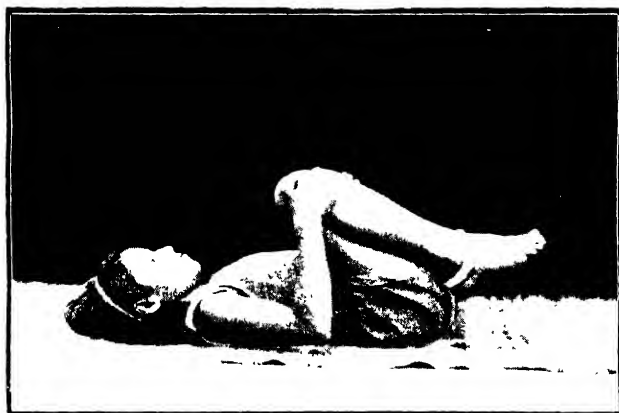


Fig. 194



Fig. 195

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Figs 196-197

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